COPYRIGHT, 1957, BY THE AMERICAN DIETETIC ASSOCIATION. Printed in U.S.A.

Entered as second-class matter June 30, 1925 at the Post Office at Baltimore, Md. under the act of August 24, 1912. Published monthly by The American Dietetic Association.

JOURNAL of the american

dietetic association

The Journal of the American Dietetic Association is published monthly by The American Dietetic Association, Mt. Royal & Guilford Aves., Baltimore 2, Md., and 620 No. Michigan Ave., Chicago 11, Ill. Neither the Association nor the Editor assumes responsibility for the opinions expressed by authors of papers abstracted, quoted, or published in full in this Journal.

Subscription Rates: $8 per year in advance in the U.S., Canada, and countries of the Postal Union; all other countries, $9 per year in advance. Special rate to undergraduate students and dietetic interns in approved internships, $2 per year in advance, if order is approved by head of the department. Single copies 75 cents in advance. All correspondence concerning Journal subscriptions, orders for copies, or reprints from the Journal and notices of change of address should be sent to The American Dietetic Association Mt. Royal & Guilford Aves., Baltimore 2, Md., or preferably 620 No. Michigan Ave., Chicago, 11, Ill. Notices regarding change of address should reach the publisher by the *25rd of the month before the date of issue* on which the change is to take effect and both old and new addresses must be given. Claims for Journals lost in the mail will not be entertained more than six months after the date of the issue involved.

Editorial Correspondence: All articles and notices for publication, general correspondence, and inquiries should be sent to the Editor at The American Dietetic Association, 620 No. Michigan Ave., Chicago 11, Ill. Manuscripts are accepted for publication on condition that they are contributed solely to the Journal. Copy must be double-spaced and two copies, an original and one carbon, submitted.

Advertising: All correspondence concerning advertising should be addressed to The American Dietetic Association, 620 No. Michigan Ave., Chicago 11, Ill.

CONTENTS— OCTOBER 1957—VOLUME 33, NUMBER 10

FUNDAMENTAL CONCEPTS OF LIVER DISEASE
Marian Lambert, M.D. 1005

IRON ABSORBED FROM THREE PREPARATIONS USED TO ENRICH BREAD
Inez K. Harrill, Ph.D., *Anna-Elisabeth Hoene*, Ph.D., *and Frances A. Johnston*, Ph.D. 1010

AMINO ACID REQUIREMENTS OF ADULTS
May S. Reynolds, Ph.D. 1015

GROWTH AND DEVELOPMENT OF PERUVIAN CHILDREN
Martha F. Trulson, D.Sc., *Carlos Collazos Ch.*, M.D., *and D. Mark Hegsted*, Ph.D. 1019

NUTRITIVE VALUE OF IRRADIATED TURKEY. I. Growth-Promoting Quality and Biologic Value
Doris Howes Calloway, Ph.D., *Edmond R. Cole, and Harry Spector*, Ph.D. 1027

NUTRITIVE VALUE OF IRRADIATED TURKEY. II. Vitamin Losses after Irradiation and Cooking
Miriam Higgins Thomas and Doris Howes Calloway, Ph.D. 1030

NUTRITIVE VALUE OF A VEGETABLE PROTEIN MIXTURE
R. F. Prier and P. H. Derse 1034

CURRENT COMMENT
Typhoon Emergency Feeding on Okinawa—*1st Lt. Patricia L. Accountius and 1st Lt. Mary L. Fisk* 1038
A "Shared" Dietitian in Fiji—*Margot C. Barnard* 1040
Culture, Economics, and Food Habits—*George S. Queen*, Ph.D. 1044
International Dietetics—Past and Future—*Mary K. Bloetjes*, Ph.D. 1052

BOOK REVIEWS 1056

CURRENT LITERATURE 1058

LIST OF EXHIBITORS, 40TH A.D.A. ANNUAL MEETING 1084

NEWS NOTES 1086

OFFICERS 1956-57

The American Dietetic Association
620 North Michigan Avenue, Chicago 11, Illinois

COORDINATING CABINET

Executive Board

President, LUCILLE M. REFSHAUGE, Hartford (Conn.) Hospital
President-Elect, E. NEIGE TODHUNTER, Ph.D., Univ. of Alabama, University
Speaker of the House of Delegates, ADELIA M. BEEUWKES, Univ. of Michigan, Ann Arbor
Secretary-Chairman, Membership Committee, MRS. HELEN HAWVER ANDERSON, Stanford Univ. Hospitals, San Francisco
Treasurer-Chairman, Finance Committee, DORIS JOHNSON, Ph.D., Grace-New Haven Community Hospital, New Haven, Conn.

Section Chairmen

Community Nutrition, MARJORIE M. MORRISON, Florida Board of Health, Jacksonville 1
Diet Therapy, MRS. ELIZABETH K. CASO, 248 Moss Hill Rd., Jamaica Plain, Mass.
Education, MRS. MARTHA NELSON LEWIS, The Ohio State Univ., Columbus 10
Food Administration, BEATRICE DONALDSON, Ph.D., School of Home Economics, Univ. of Wisconsin, Madison 6

Public Relations Chairman

HELEN GER OLSON, Div. of Indian Health, Public Health Service, Washington, 25, D. C.

Council of the House of Delegates

Speaker, ADELIA M. BEEUWKES, Univ. of Michigan, Ann Arbor
Speaker-Elect, GERALDINE M. PIPER, Univ. of Tennessee, Knoxville

Delegates of the House of Delegates

RUTH S. DICKIE, Sec., Wisconsin General Hospital, Madison 6 1957
LEVELLE WOOD, The Ohio State Univ., Columbus 10 1957
EDITH A. JONES, National Institutes of Health, Bethesda 14. 1958
EFFIE MAY WINGER, New England Deaconess Hospital, Boston 15 1958

Senior Delegates-at-Large

ERCEL S. EPPRIGHT, Ph.D., Iowa State College, Ames 1957
HELEN A. HUNSCHER, Ph.D., Western Reserve Univ., Cleveland 6 1957
BEULAH HUNZICKER, Oak Park, Illinois 1958
C. FRANCES MACKINNON, Univ. of North Carolina, Chapel Hill 1958

Delegate-at-Large

FERN W. GLEISER, Univ. of Chicago 1959

HEADQUARTERS STAFF

RUTH M. YAKEL, Executive Director
DOROTHY J. BATES, Organizational Liaison Director
MILDRED L. EGEBERG, Advertising and Exhibition Director
MRS. DOROTHY WEBER INYARD, Membership and Credentials Director
MRS. THELMA POLLEN, Public Relations Director
WILMA F. ROBINSON, Dietetic Internship Liaison Director
MRS. DOROTHEA F. TURNER, Editor, JOURNAL
HARRIET E. SANKEY, Managing Editor, JOURNAL
LEONARD D. SMITH, Business Manager
MRS. BESSIE B. WEST, Continuing Education Services Director
CLARA ZEMPEL, State Activities Director and Program Coordinator

BOARDS AND COMMITTEE CHAIRMEN

Advisory Board

GEORGE BUGBEE, *Chairman*—Health Information Foundation, New York 17, N. Y. 1957
FRANK R. BRADLEY, M.D., Barnes Hospital, St. Louis 10 1958
FREDRICK J. STARE, M.D., Ph.D., Harvard School of Public Health, Boston 15 1959

Awards, Scholarship and Loan Fund Board

DENA C. CEDERQUIST, Ph.D., *Chairman*—Michigan State Univ., East Lansing 1957

Dietetic Internship Board

MRS. CORINNE H. ROBINSON, *Chairman*—Drexel Institute of Technology, Philadelphia 4 1957

Journal Board

RUTH L. HUENEMANN, D.Sc., *Chairman*—Univ. of California, Berkeley 1957
JANE M. LEICHSENRING, Ph.D., Univ. of Minnesota, St. Paul 1957
ROSEMARY L. LODDE, Veterans Administration, Washington 25, D. C. 1957
PEARL J. ALDRICH, Ph.D., Michigan State Univ., East Lansing 1958
E. ALLIENE MOSSO, St. Luke's Hospital, New York 25, N. Y. 1958
LORRAINE G. WENG, National Dairy Council, Chicago 2 1958
BEATRICE DONALDSON, Ph.D., Univ. of Wisconsin, Madison 1959
FRIEDA L. MEYER, Ph.D., Univ. of Alabama, University 1959
ELIZABETH D. MUNVES, Ph.D., New York Univ., New York 3, N. Y. 1959

Committee Chairmen

Annual Meeting, MRS. JEAN MILLER PORT, VA Regional Office, Miami; MARION KUTNICK, Mt. Sinai Hospital, Miami Beach
Civil Defense, DOROTHY L. BOVEE, American National Red Cross, Washington, D. C.
Educational Exhibits, M. ELIZABETH VAUGHN, Visiting Nurse Assn., Detroit 1
History of A.D.A., GRACE BULMAN, Director, Dietetic Service, Veterans Administration, Washington 25, D. C.
History of Nutrition and Dietetics, HELEN S. MITCHELL, Ph.D., Univ. of Massachusetts, Amherst
Library, ELIZABETH H. TUFT, Chicago Wesley Memorial Hospital, Chicago 11
Nominating, EDITH A. JONES, National Institutes of Health, Bethesda 14
Program Planning, FRANCES L. LOW, Methodist Hospital, Houston; EDITH A. JONES, National Institutes of Health, Bethesda
Career Guidance, SOPHIA M. PODGORSKI, Pennsylvania Dept. of Health, Wilkes-Barre

PRESIDENTS OF STATE DIETETIC ASSOCIATIONS AFFILIATED WITH THE AMERICAN DIETETIC ASSOCIATION

ALABAMA: Kathleen R. Stitt, 1413 Cloverdale Gardens, Tuscaloosa
ARIZONA: Virginia L. Felch, 3016 N. 47th St., Phoenix
ARKANSAS: Mrs. Mary T. Bell, 2519 Durwood Rd., Little Rock
CALIFORNIA: Gertrude E. Miller, G. M. & S. Hospital, VA Center, Los Angeles 25
COLORADO: Dorothy E. Scott, 3301 W. 36th Ave., Denver 11
CONNECTICUT: Bertha B. Ashley, New Britain General Hospital, New Britain
DELAWARE: Nona Bradford, 722 Marsh Rd., Carrcroft, Wilmington 3
DISTRICT OF COLUMBIA: Katherine Andrews, 10218 Gardiner Ave., Silver Spring, Md.
FLORIDA: Mrs. May McBath, Pinellas County Health Dept., St. Petersburg 4
GEORGIA: Mrs. Helen B. Bose, 5300 Redan Rd., R. #1, Stone Mountain
IDAHO: Ethel Tuman, VA Center, Fifth & Fort Sts., Boise
ILLINOIS: Ruth M. Kahn, American Hospital Assn., Chicago 10
INDIANA: Margaret A. Dunham, Ind. Board of Health, Indianapolis 7
IOWA: Margaret O. Osborn, Ph.D., State Univ. of Iowa, Iowa City
KANSAS: Arlene Payne, Univ. of Kansas Medical Center, Kansas City
KENTUCKY: Mrs. Nancy S. Brooks, 259 Burke Rd., Lexington
LOUISIANA: Mrs. Jean F. Hageman, 2001 Madeline St., Alexandria
MAINE: Mary Jo Hitchcock, Univ. of Maine, Orono
MARYLAND: Celia A. Whitney, Sinai Hospital, Baltimore 5
MASSACHUSETTS: Helen G. McDonald, New England Baptist Hospital, Boston 20
MICHIGAN: Myrtle B. Van Horne, Mich. Dept. of Health, Lansing 4
MINNESOTA: Sister M. Bernadette (Lies), College of St. Teresa, Winona
MISSISSIPPI: Marcie D. Sanders, Forrest County Health Dept., Hattiesburg
MISSOURI: Mrs. Lillian S. Mowry, Menorah Medical Center, Kansas City 10
MONTANA: Gladys H. Roehm, Ph.D., Montana State College, Bozeman
NEBRASKA: Anna Smrha, Neb. Dept. of Health, Lincoln
NEVADA: Elizabeth Frey, 1330 University Terr., Reno
NEW HAMPSHIRE: Mrs. Anna M. King, Moore General Hospital, Grasmere
NEW JERSEY: Ann G. Bryson, 297 Central Ave., Orange
NEW MEXICO: Kris Ann Konugres, Los Alamos Medical Center, Los Alamos
NEW YORK: Marion P. Randall, New York Hospital, Westchester Div., White Plains
NORTH CAROLINA: Mrs. Mabel G. Rogers, N. Car. School for the Blind, Raleigh
NORTH DAKOTA: Mrs. Ethel L. Dietz, VA Hospital, Fargo
OHIO: Mrs. Virginia D. Millholland, Univ. Hospital, Columbus 10
OKLAHOMA: Mrs. Kathleen S. Atha, 834 E. Oak, Cushing
OREGON: Marie I. Hansen, Sacred Heart Hospital, Eugene
PENNSYLVANIA: Mary Agnes Wesner, Allegheny General Hospital, Pittsburgh 12
RHODE ISLAND: Lois M. Yohe, Memorial Hospital, Pawtucket
SOUTH CAROLINA: Mrs. Katherine R. Bailey, 3212 Carson Dr., Columbia
SOUTH DAKOTA: Sister M. Inez, O.S.B., Sacred Heart Convent Hospital, Yankton
TENNESSEE: Mrs. Betty J. Cotter, Baroness Erlanger Hospital, Chattanooga 3
TEXAS: Margaret L. Johnson, Memorial Hospital, Houston 2
UTAH: Mrs. Nell M. Hathaway, VA Hospital, Fort Douglas Div., Salt Lake City
VERMONT: Milla Newland, 25 Mansfield Ave., Burlington
VIRGINIA: Mabel Todd, Va. Dept. of Health, Richmond 19
WASHINGTON: J. June Stein, Wash. State Dept. of Health, Seattle 4
WEST VIRGINIA: Mrs. Mary B. Shafer, 518 Main St., Charleston
WISCONSIN: Mrs. Edith B. Getz, Methodist Hospital, Madison
WYOMING: D. Jean Golden, Ivinson Memorial Hospital, Laramie
ALASKA: Mrs. LaVerl B. Fehling, 3rd & East Q Sts., Anchorage
HAWAII: Mrs. Virginia T. Cooksey, Box 921, Wahiawa, Oahu

Fundamental Concepts of Liver Disease[1]

MARIAN LAMBERT, M.D.

Instructor in Pathology,
University of Kansas Medical Center,
Kansas City, Kansas

FOR MANY years it has been adequate, generally speaking, for the dietitian to know that the patient with liver disease has anorexia, a poor tolerance for fats, and a need for a high-protein, high-carbohydrate, high-vitamin diet. Her knowledge of liver disease *per se* was relatively unimportant. This state of affairs is rapidly changing. The dietitian is as important now in the prevention and management of diseases of the liver as she has been in the past in the management of diabetes mellitus. The purpose of this paper is to review certain basic features of liver disease and the medical treatment as it concerns the dietitian. It will be recognized that there has been a deliberate over-simplification of the problems involved but the justification for this is apparent when one turns to the voluminous literature covering this subject. It is felt that an understanding of the basic features of liver disease will serve as a starting point for more comprehensive study.

It has now been demonstrated experimentally that certain specific dietary deficiencies produce specific types of liver disease comparable to or identical with that seen in the human being (1–10). Although the application of this knowledge has not been studied adequately, the implication is that eventually such serious diseases as post-necrotic and nutritional cirrhosis will not only be preventable but will be reversible, to some extent, by the administration of specific dietary constituents in much the same way that vitamin deficiencies are preventable at the present time. To understand these amazing discoveries, however, it is necessary to understand the differences in certain types of injury to the liver.

In general, two different types of liver injury occur in response to noxious agents or dietary deficiencies (5, 11). One is called *hepatitis,* or hepatic necrosis, and is characterized by rapid destruction of liver cells. The other is called *cirrhosis* and is characterized by a relatively slow destruction of liver cells in addition to a proliferation of fibrous tissue which results in diffuse scarring of the liver. Actually, hepatitis may become chronic and eventually produce cirrhosis. It is differentiated from the other types of cirrhosis, however, by the designation as "post-necrotic" cirrhosis.

Etiology and Pathology

Hepatitis or necrosis of liver cells occurs in a variety of diseases and several etiologic factors may be involved. A few of the more common ones are:

1. Viral infections.
   a. Acute infectious hepatitis.
   b. Homologous serum jaundice.
2. Other infectious agents.
3. Chemical toxins.
4. Anoxia.
5. Dietary deficiencies of cystine, vitamin E, and a factor in casein.

The destruction of liver cells, whether focal or diffuse, appears to be so complete that they seem to have disappeared without a trace. The reticular framework which supports the cells collapses, and inflammatory cells and hemorrhagic foci are present. Such a liver, as a result, is grossly dark red in color, flabby in consistency, and smaller than normal.

Cirrhosis is also the result of various etiologic factors. A descriptive term usually indicates the cause as follows:

1. Nutritional cirrhosis (Laennec's or alcoholic) due to a dietary deficiency of choline.
2. Post-necrotic cirrhosis.
   a. Due to a dietary deficiency of cystine, vitamin E, and a casein factor.
   b. Due to viral infections, and so on.
3. Biliary cirrhosis due to obstruction of the biliary ducts.
4. Cardiac cirrhosis due to circulatory stasis.
5. Miscellaneous types (hemochromatosis, and so on).

All cirrhotic livers are diffusely fibrotic which makes them firm in consistency. Ultimately, the lobular pattern or architecture is distorted due to the pro-

[1] Presented before the annual meeting of the Kansas Dietetic Association in Kansas City, Kansas, on April 26, 1957.

liferation of fibrous tissue and to the regeneration of new liver nodules. In nutritional cirrhosis, the type with which we are principally concerned, the early lesion is an accumulation of fat within the liver cells, the so-called fatty liver (12). Eventually, the liver cells rupture and coalesce to form fatty cysts. This is followed by fibrous tissue proliferation and nodular regeneration. Such a liver is yellow and greasy, firmer than normal, and nodular. It may be large or small, depending to a large extent on the duration of the disease.

Complications

The complications of both hepatitis and cirrhosis are important to the dietitian because they may alter therapy radically. In general, the complications of importance consist of either circulatory changes or the development of hepatic coma. Actually, circulatory changes occur only in long-standing liver disease and are therefore seen in advanced cirrhosis. Hepatic coma, however, may occur in either acute hepatitis or cirrhosis because it results from injury sufficient to impair the functional integrity of the liver.

The circulatory changes in cirrhosis occur because scar tissue partially obliterates the portal blood supply, and shunts it away from the new regenerating liver tissue (13). Most of the effective circulation is then carried on by branches of the hepatic artery. Numerous arterio-venous communications develop within the liver between the branches of this artery and branches of the portal vein. Since portal venous pressure is normally much lower than that of the hepatic artery, these communications, together with the partial obstruction of the portal system by fibrous tissue, cause a marked increase in the pressure of the entire portal system. The result is congestion and dilatation of all veins leading into this system, including the abdominal, esophageal, gastric, splenic, and the superior and inferior mesenteric veins which drain the intestinal tract. Varicose veins of the esophagus develop regularly in patients with significant portal hypertension and frequently result in severe or fatal hemorrhage.

Hepatic Coma

Hepatic coma is characterized by neurologic changes and an alteration in nitrogen metabolism. Although the mechanism is not clear at present, it is postulated by some investigators that hepatic coma is the result of ammonia intoxication (14, 15).

It will be recalled that ammonia is formed when proteins are deaminated either by enzymatic or bacterial action in the intestine. Ammonia may also be increased in the intestine by massive hemorrhage from esophageal varices and the subsequent digestion of blood proteins, or by the administration of ammonia-containing drugs, such as exchange resins, ammonium chloride, or certain salt substitutes which contain ammonium ion. Although ammonia is toxic, when it is carried to the normal liver by the portal vein, the liver cells convert it into urea which is nontoxic. This reaction is as follows:

$$2NH_3 + CO_2 + H_2O \rightarrow \begin{matrix} NH_2 \\ | \\ C{=}O \\ | \\ NH_2 \end{matrix} + 2H_2O$$

If the liver cells are largely necrotic, as in massive hepatic necrosis, or if the portal blood by-passes the existing liver cells, as in advanced cirrhosis, then ammonia escapes in large quantity into the systemic blood stream. The central nervous system is particularly vulnerable to this toxic substance because the normal respiration of brain tissue is dependent on adequate supplies of the amino acid, glutamic acid. Unfortunately, glutamic acid has an affinity for ammonia as indicated in the following reaction:

$$\begin{matrix} COOH \\ | \\ CH_2 \\ | \\ CH_2 \\ | \\ CHNH_2 \\ | \\ COOH \end{matrix} + NH_3 \rightarrow \begin{matrix} CONH_2 \\ | \\ CH_2 \\ | \\ CH_2 \\ | \\ CHNH_2 \\ | \\ COOH \end{matrix} + H_2O$$

Glutamic acid — Ammonia — Glutamine — Water

When glutamic acid is combined with the circulating ammonia, it is unavailable for normal brain metabolism (16) and the patient develops the neurologic symptoms of impending hepatic coma. These consist of personality changes, lethargy, and flapping tremor of the hands. If ammonia production in the body is quickly decreased by limiting the dietary protein drastically and if glutamic acid is administered, then it is frequently possible to reverse these symptoms rapidly. If they are not reversed, the patient will lapse into deep coma and expire. It is entirely possible that the alert dietitian on ward rounds may detect some personality change, such as a sudden uncooperative attitude, which will make early diagnosis possible. For this reason, she should bear in mind the symptoms of impending coma as well as the treatment and the rationale for that treatment.

Factors which precipitate hepatic coma may be summarized as follows:

(a) Malnutrition
(b) High-protein diet
(c) Gastrointestinal hemorrhage
(d) Drugs containing ammonium ion
(e) Infection
(f) Anoxia (hemorrhage, surgery)
(g) Toxic agents (sedatives, anesthetics)
(h) Hemodilution (excessive parenteral fluids)
(i) Increased basal metabolic rate (fever, fatigue, restlessness)

As explained, high-protein diets, blood in the gastrointestinal tract, and drugs containing the ammonium ion increase the ammonia which is absorbed. Malnutrition enhances the breakdown of body protein and, in addition, adds the insult of dietary deficiency which furthers the degree of liver injury. Infection, anoxia, and toxic agents also increase the existing injury. An elevation in the metabolic rate increases the need for dietary constituents and causes a more rapid utilization of body protein. Hemodilution may lead to water intoxication, because these patients have a decreased tolerance for water and are subject to sodium depletion (17).

Treatment for Hepatic Coma

The treatment of hepatic coma may be summarized briefly as follows (18–21):

1. Dietary.
   a. Total calories (2000 daily unless patient is restless or has fever).
   b. Low-protein (1 gm. per kilogram per day if tolerated).
   c. Carbohydrate (300 gm. per day or more).
   d. Fat.
   e. Vitamins.
   f. Low-sodium (200 mg. per day if edema or ascites is present).
2. Drugs.
   a. Sodium glutamate.
   b. Antibiotics.
   c. ACTH or cortisone (?)
3. Rest without sedation.

The total caloric intake must be adequate to encourage protein synthesis and to prevent the excessive breakdown of endogenous protein. It must not be excessive because of the possibility of creating relative deficiencies for essentials such as choline and vitamins. Thus, it should be as nearly basal as possible. Although the protein in the diet is essential for healing, in the first few days of hepatic coma it may have to be virtually eliminated and then gradually increased (19). If the patient will tolerate it, however, it is ideal to give 1 gm. per kilogram of body weight as recommended by the National Research Council. Carbohydrate protects the liver and should be given in the amount of 300 gm. or more daily. Fat need not be restricted within the caloric limit, but most patients tolerate fats poorly. Vitamins should be adequate but not excessive. Sodium is restricted only if there is edema or ascites.

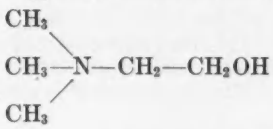
Experimental Liver Disease

As indicated at the beginning of this paper, recent experimental work has made possible the study of specific types of liver disease due to specific dietary deficiencies. This has contributed much to our understanding, because previous experimental results were confusing to say the least. By using hepato-toxic agents, such as certain colored dyes, liver injury was produced and studied but the results were variable because of failure to adhere to strict dietary control. The demonstration that dietary deficiencies alone may also produce severe injury has made it possible to distinguish the various types of injury produced experimentally.

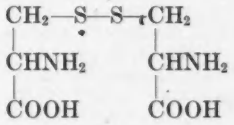
Hepatic necrosis in the experimental animal, which mimics acute infectious hepatitis or homologous serum jaundice in man, may be produced by feeding a diet deficient in cystine (2, 5) vitamin E (8), and some unidentified factor in casein (10). Nutritional cirrhosis in the experimental animal, which mimics or is identical to fatty liver and cirrhosis in man (also called Laennec's cirrhosis and alcoholic cirrhosis), may be produced by feeding a diet deficient in choline (1, 11). Furthermore, it has been shown that whereas choline protects against fatty liver and cirrhosis, it aggravates hepatic necrosis when given in excess (22). Cystine in excess will aggravate both necrosis and cirrhosis (23). The amino acid methionine plays a dual role in preventing both conditions (22). Both conditions are helped by the administration of antibiotics (24, 25) and anti-thyroid drugs (26), and both are aggravated by a diet high in unsaturated fatty acids (22).

These findings are indicated below:

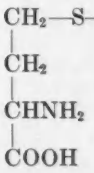
Choline
Prevents fatty liver
Aggravates liver necrosis



Cystine
Prevents liver necrosis
Aggravates fatty liver



Methionine
Prevents fatty liver
Prevents liver necrosis



The effectiveness of methionine probably resides in the fact that it has a labile methyl group (choline has three such groups) and also contains a sulphur group (cystine has two such groups).

Fatty Liver and Cancer

An arresting concept for the dietitian, as well as for the entire medical field, is the fact that dietary deficiencies have been shown to be one of the major factors in the production of carcinoma of the liver in the experimental animal (27). Since fatty liver and cirrhosis, but not carcinoma, are reversible, the implication is that a balanced diet will prevent certain types of carcinoma by arresting the progress of fatty liver and cirrhosis before malignancy develops. This seems all the more reasonable when one considers that the majority of patients with primary carcinoma of the liver have an associated nutritional cirrhosis (28). The nutritional factors leading to fatty liver thus gain even greater importance and may be summarized as follows:

(a) Starvation.

(b) Low-protein diet (choline and methionine deficiency).

(c) High-fat diet (29) (relative choline deficiency).

(d) High-carbohydrate diet (30) (relative choline deficiency).

(e) Vitamin imbalance (thiamine and biotin excesses).

Summary

It must seem obvious that the dietitian plays a new and exciting role in the prevention and management of liver disease. It is possible, through her teaching, that she may contribute to the prevention of certain types of carcinoma. Assuredly, her application of the newer concepts of medical management for patients with hepatitis and cirrhosis will be a major factor in relieving the suffering and distress common to these disorders.

Cited References

(1) Best, C. H., Hershey, J. M., and Huntsman, M. E.: The control of the deposition of liver fat. Am. J. Physiol. 101: 7, 1932.

(2) Weichselbaum, T. E.: Cystine deficiency in the albino rat. Quart. J. Exper. Physiol. 25: 363, 1935.

(3) György, P., and Goldblatt, H.: Hepatic injury on a nutritional basis in rats. J. Exper. Med. 70: 185, 1939.

(4) Rich, A. R., and Hamilton, J. D.: The experimental production of cirrhosis of the liver by means of a deficient diet. Bull. Johns Hopkins Hosp. 66: 185, 1940.

(5) Daft, F. S., Sebrell, W. H., and Lillie, R. D.: Prevention by cystine or methionine of hemorrhage and necrosis of the liver in rats. Proc. Soc. Exper. Biol. & Med. 50: 1, 1942.

(6) Spellberg, M. A., Keeton, R. W., and Ginsberg, R.: Dietary production of hepatic cirrhosis in rabbits, with an analysis of the factors involved. Arch. Path. 33: 204, 1942.

(7) Hock, A., and Fink, H.: Über eine schwere ernährungsbedingte Stoffwechselstörung und ihre Verhutung durch Cystin. Hoppe Seyler's Ztschr. f. physiol. Chem. 278: 136, 1943.

(8) Schwarz, K.: Tocopherol als Leberschutzstoff. Hoppe Seyler's Ztschr. f. physiol. Chem. 281: 109, 1944.

(9) Glynn, L. E., and Himsworth, H. P.: Massive acute necrosis of the liver: its significance and experimental production. J. Path. & Bact. 56: 297, 1944.

(10) Schwarz, K.: A hitherto unrecognized factor against dietary necrotic liver degeneration in American yeast (Factor 3). Proc. Soc. Exper. Biol. & Med. 78: 852, 1951.

(11) Daft, F. S.: Experimental differentiation between liver necrosis and liver cirrhosis and some dietary factors affecting their development. Ann. New York Acad. Sc. 57: 623, 1954.

(12) Hartroft, W. S.: The sequence of pathologic events in the development of experimental fatty liver and cirrhosis. Ann. New York Acad. Sc. 57: 633, 1954.

(13) Popper, H., Elias, H., and Petty, D. E.: Vascular pattern of cirrhotic liver. Am. J. Clin. Path. 22: 717, 1952.

(14) Monguio, J., and Krause, F.: Über die Bedeutung des NH_3—Gehaltes des Blutes für die Beurteilung der Leberfunktion. Klin. Wchnschr. 13: 1142, 1934.

(15) Phillips, G. B., Schwartz, R., Gabuzda, G. J., Jr., and Davidson, C. S.: Syndrome of impending hepatic coma in patients with cirrhosis of liver given certain nitrogenous substances. New England J. Med. 247: 239, 1952.

(16) Weil-Malherbe, H.: Significance of glutamic acid for metabolism of nervous tissue. Physiol. Rev. 30: 549, 1950.

(17) Gabuzda, G. J., Jr., Traeger, H. S., and Davidson, C. S.: Hepatic cirrhosis: effects of sodium chloride administration and restriction and of abdominal paracentesis on electrolyte and water balance. J. Clin. Invest. 33: 780, 1954.

(18) Patek, A. J., Jr., Post, J., Ratnoff, O. D., Mankin, H., and Hillamn, R. W.: Dietary treatment of cirrhosis of the liver. Results in one hundred twenty-four patients observed during a ten year period. J.A.M.A. 138: 543, 1948.

(19) Davidson, C. S.: Hepatic coma. Advances Int. Med. 7: 33, 1955.

(20) Sherlock, S., Summerskill, W. H. J., and Dawson, A. M.: The treatment and prognosis of hepatic coma. Gastroenterologia 86: 395, 1956.

(21) Walshe, J. M.: Hepatic coma. Postgrad. Med. 32: 467, 1956.

(22) György, P., and Goldblatt, H.: Further observations on production and prevention of dietary hepatic injury in rats. J. Exper. Med. 89: 245, 1949.

(23) Earle, D. P., Jr., and Victor, J.: The effect of various diets on the liver damage caused by excess cystine. J. Exper. Med. 75: 179, 1942.

(24) Farquhar, J. D., Stokes, J., Jr., Whitlock, C. M., Jr., Bluemle, L. W., Jr., and Gambescia, J. M.: Studies on the use of Aureomycin in hepatic disease. 3. A note on Aureomycin therapy in hepatic coma. Am. J. M. Sc. 220: 166, 1950.

(25) Phear, E. A., Ruebner, B., Sherlock, S., and Summerskill, W. H. J.: Methionine toxicity in liver disease and its prevention by chlortetracycline. Clin. Sc. 15: 93, 1956.

(26) György, P., Rose, C. S., and Goldblatt, H.: Prevention of experimental dietary hepatic cirrhosis by goitrogenic substances. Proc. Soc. Exper. Biol. & Med. 67: 67, 1948.

(27) Copeland, D. H., and Salmon, W. D.: Liver carcinoma and related lesions in chronic choline deficiency. Ann. New York Acad. Sc. 57: 664, 1954.

(28) Edmondson, H. A., and Steiner, P. E.: Primary carcinoma of the liver; study of one hundred cases among 48,900 necropsies. Cancer 7: 462, 1954.

(29) CHANNON, H. J., HANSON, S. W. F., AND LOIZIDES, P. A.: The effect of variations of diet fat on dietary fatty livers in rats. Biochem. J. 36: 214, 1942.

(30) BEST, C. H., HARTROFT, W. S., LUCAS, C. C., AND RIDOUT, J. H.: Liver damage produced by feeding alcohol or sugar and its prevention by choline. Brit. M. J. 2: 1001, 1949.

Other References

Symposium on nutritional factors and liver disease. Ann. New York Acad. Sc. 57: (May), 1954.

POPPER, H., AND SCHAFFNER, F.: Liver: Structure and Function. N. Y.: McGraw-Hill Book Co., Inc., 1957.

SCHIFF, L.: Diseases of the Liver. Philadelphia: J. B. Lippincott Co., 1956.

SHERLOCK, S.: Diseases of the Liver and Biliary System. Oxford, England: Blackwell Scientific Publications, Ltd., 1955.

SPELLBERG, M. A.: Diseases of the Liver. N. Y.: Grune & Stratton, 1954.

LICHTMAN, S. S.: Diseases of the Liver, Gallbladder and Bile Ducts. Vol. I and II, 3rd. ed. Philadelphia: Lea & Febiger, 1953.

JOSIAH MACY, JR., FOUNDATION: Transactions of the Conferences on Liver Injury. Vol. 9 through 12. N. Y.: Corlies, Macy & Co., 1950–1953.

LEEVY, C. M.: Practical Diagnosis and Treatment of Liver Disease. N. Y.: Paul B. Hoeber, Inc., Medical Dept., Harper & Bros., 1957.

The Joys of the Table

In April 1957, the new Journal, *MD*, carried the following editorial by its Publisher and Editor-in Chief, Felix Marti-Ibanez, to introduce a special feature on ways of dovetailing the "millenary empiricism of the cook and the modern knowledge of the dietician." Mary P. Huddleson, former Editor of this JOURNAL, forwarded this to the present editors. We think, with her, that this editorial bears excerpting:

> The physician today is interested in cooking both as a professional whose advice is sought by his patients and as a human being who relishes the pleasures of the table. In presenting a culinary panorama, *MD* seeks to demonstrate that gastronomy is not totally irreconcilable with dietetics.
>
> Cooking is tradition. This is why the elaborate art of superb cooking is exclusive with old countries, those along the Mediterranean, for instance; whereas the cooking of young countries, predominantly industrial and technologic, is characterized by its simplicity. To be excited to emotional heights by exquisite food, as by artistic beauty, requires centuries of apprenticeship.
>
> Few will deny that French cuisine has always reigned supreme, followed by the Italian and the Spanish. Italian and Spanish cooking cater to hunger. French cooking caters to the appetite, which is a fine intellectual "emotion" demanding more than just eating. French cooking is independent of hunger and is a pure and marvelous artifice, a *mise en scène*.
>
> Brillat-Savarin always insisted on the difference between the pleasures of eating and the pleasures of *the table*. The first entails only hunger and its appeasement; the second includes not only the food but also how and where it is served and with whom it is enjoyed. Eating merely satisfies the pangs of hunger; *the table* excites the appetite and combines, as G. Bernard Shaw once defined matrimony, maximum temptation with maximum opportunity.
>
> Physicians should take an interest in cooking and the pleasures of the table. Good cooking does more for family unity, than the best television. Good cooking should bring out, not drown, the natural flavor of food, just as a dress should outline, not conceal, the graceful lines of a woman's figure. "Scientific" cooking need not be insipid. In every meal there is a factor as important as calories, vitamins, and amino acids—the psychological factor. A good meal should leave us *psychologically* satisfied.
>
> Cooking is a revealing key to the culture of a country. "National" dishes reflect a country's soul. The Spaniard's tendency to violence, his flair for bright colors, are evident in his polychrome *paellas*—the watercolor of the kitchen—and his encyclopedic *cocidos*. Japanese compulsion toward order and cleanliness is transplanted into those miniature gardens on the table that constitute their favorite soups. The aseptic robustness and reserve of the British is transmuted into roast beef and Yorkshire pudding. The Scandinavian seafaring atmosphere is reflected in its *smörgasbords* teeming with marine creatures. Gaelic subtlety is expressed in their delicate sauces; Italian earthiness in their pastas, enhanced by endearing onions, tinted with the scarlet of tomatoes and crowned with the gracious touch of cheese. The American cuisine is assimilating in its melting pot the best of international cooking.
>
> The physician must be something of a gastronome for his patients' sakes and for his own; did not Hippocrates in his aphorisms stress pleasure equally as much as wholesomeness in eating? Although the physician must choose moderation, he need not sacrifice quality and style in cooking.
>
> Above everything else, the physician realizes the importance to health of initiating a crusade —beginning in his own home and continuing with his patients—to cultivate not the habit of eating but the pleasures of the table. This crusade would revive the spiritual pleasures inherent in fine dining, such as leisure, courtesy, and graciousness in presentation and service, a pleasant atmosphere, a good wine to tickle the heart, and the music of feminine voices instead of the radio. A crusade to turn us into cosmopolites in our gastronomic tastes is the best way to develop brotherhood between men and nations.

Iron Absorbed from Three Preparations Used to Enrich Bread[1]

INEZ K. HARRILL, Ph.D.,[2] ANNA-ELISABETH HOENE, Ph.D.,[3] and FRANCES A. JOHNSTON, Ph.D.[4]

New York State College of Home Economics and Graduate School of Nutrition, Cornell University, Ithaca

THIS STUDY was conducted to measure the percentage of iron absorbed by human subjects from iron-enriched bread and also to compare the biologic availability of the three iron preparations most commonly used for enrichment. The three preparations under investigation were: reduced iron (finely powdered metallic iron), ferric orthophosphate, and ferrous sulphate.

To find the amount of iron absorbed, some way must be found to eliminate iron from gastrointestinal sources from the iron value for the feces, so that the value represents only unabsorbed food iron. For this purpose, this experiment was designed with a control period when no iron enrichment was added to the bread. The increase in fecal iron in later periods during which the bread was enriched would then be due solely to the iron not absorbed from the enriching iron, provided the basal diet was constant in iron content.

The validity of this method of finding the amount of iron absorbed rests on two assumptions. One is that the amount of iron from gastrointestinal sources is the same on the diet containing enrichment as on the low-iron control diet. The authors know of no work which supplies an answer to this question for iron, although Visek *et al.* (1) have found that an increase in the intake of calcium, which behaves similarly to iron in many respects, does not affect the amount of endogenous calcium in the feces of cows until the altered diet has been fed for a long enough time to affect the stores.

The second assumption is that the ability of the subjects to absorb iron does not change from control to experimental period. The ability of people to absorb more iron from small amounts than from large ones has long been recognized. However, in planning this study, it was assumed that the subjects would not absorb an appreciably lower percentage in changing from a daily intake of 5½ mg. to 13 mg., an assumption based on experience in this laboratory. The subjects' ability to absorb iron might also change because of physiologic changes in the subjects, including those induced by psychologic conditions. If the ability of a subject to absorb declines from the control to the experimental diet, negative values for the amount absorbed from the test-food may be obtained.

Procedure

Nine college women whose mean age was thirty-one years and who varied in age from twenty-two through thirty-six years served as subjects. The mean height was 161.3 cm.; the mean weight was 53.8 kg. The subjects were selected on the basis of physical fitness as judged by a medical examination, a normal hemoglobin level, and normalcy of red blood cell types.

The experiment consisted of four twenty-eight-day treatment periods. The first period served as a control time, during which the bread was not enriched with iron. During the next three treatment

[1] This research was supported in part by a grant from the Williams-Waterman Fund for the Combat of Dietary Diseases, New York, New York. Received for publication October 18, 1956.

[2] Present address: Colorado Agriculture and Mechanical College, Fort Collins.

[3] Present address: Division of Home Economics, University of West Virginia, Morgantown.

[4] The cooperation of the nine young women whose service as subjects made this study possible is gratefully acknowledged, as is the cooperation of Elizabeth K. Diao and the assistance of Shirley Friend, the dietitian. The authors wish to express appreciation to the Pillsbury Mills, Inc., Minneapolis, for the flour.

periods, the bread was fortified with ferric phosphate, ferrous sulphate, or reduced iron, but no other changes were made in the diet. The subjects were divided into three groups, and each group was given iron-enriching preparations in a different order. The first four days in each treatment period served as an adjustment period. Therefore, all iron values for treatment periods were for twenty-four days.

The basal diet was planned on a four-day basis. Each day it included two glasses of milk, one serving of meat, two or more servings of vegetables, two or more servings of fruit, and one 200-gm. loaf of bread. It was planned to supply 1900 calories and 60 gm. protein a day and to meet the recommended allowances of the Food and Nutrition Board (2) for all nutrients except iron. A few low-iron foods were allowed *ad libitum* to meet variations in energy needs; the iron content was determined by analyses and was included in the computation of the intake.

Iron intakes in this study were kept low because low levels of intake furnish a more critical test of iron absorption than high levels. A basal diet containing 7 mg. was selected as the lowest level of intake which would cover the needs of the majority of the subjects and would not in twenty-eight days deplete the stores of those whose needs were higher. To facilitate the measurement of small amounts of iron that might be absorbed from the iron preparations, bread was doubly enriched and the total daily anticipated intake of iron was 12 mg., an amount within normal dietary limits.

The bread was baked in the laboratory, using a formula typical of baker's bread and was doubly enriched with thiamine, riboflavin, and niacin. The reduced iron was added to the flour at the flour mill; the ferrous sulphate and ferric phosphate were disintegrated in water and added when the bread was made. This is the usual commercial practice. Two hundred and forty gm. raw dough were weighed and baked in individual loaves to serve as the daily portions of bread for each subject. Due to differences in evaporation of water during baking, the baked loaves were not all the same weight, but all weighed a little more than 200 gm. Each pan of bread was baked inside a roll of aluminum foil to prevent contamination with rust.

Much care was taken to prevent contamination of food with iron. Distilled water was used for food preparation and for drinking. Also, much effort was spent in keeping the basal diet constant in iron content. This was necessary so that the only change in the iron content was due to the enriching iron.

The servings of food used for analysis were weighed on dietetic spring scales at the same time and in the same way as food was weighed for the subjects. The daily food collections were mixed in mechanical blenders and at the end of each four-day collection period, aliquot portions were combined for duplicate composites. New blades were placed in the blenders once a month to avoid danger of iron contamination. The four-day composites were heated with hydrochloric acid, made to a given volume, and stored. The feces, marked with carmine given before the first breakfast of each four-day collection period, were heated with hydrochloric acid and stored in glass bottles.

The food and feces were wet-ashed with nitric and sulphuric acids and the nitrosyl sulphuric acid was broken down by boiling with water according to the method of Roberts, Beardsley, and Taylor (3). The thiocyanate method of Stugart (4) was used to determine iron, and the transmission of color was measured in an Evelyn photoelectric colorimeter. Fecal values were corrected for the iron content of facial tissues used as toilet paper.

The dry-weight of the feces for each four-day collection period was determined for use in the interpretation of fecal values for iron. The concentration of hemoglobin in the blood was measured at the end of each treatment period, and serum iron levels of six subjects were determined eight months after the close of the dietary period.

Results and Conclusion

The mean iron content of the basal diet plus the foods allowed *ad libitum* was 5.47, 5.45, 5.45, and 5.43 mg. per day during the control, the reduced iron, ferrous sulphate, and ferric phosphate periods, respectively. Thus, the iron intake, aside from the enriching iron, remained remarkably constant throughout the entire experiment; minor variations among the subjects were due to the foods eaten *ad libitum* or to medicines.

The mean daily iron content of the unenriched bread was 1.23 mg. The mean daily amount of enrichment added to the bread as reduced iron, ferrous sulphate, and ferric phosphate was 7.63, 7.36, and 7.06 mg. respectively.

The mean daily iron content of the feces for all the subjects was 4.50, 11.96, 11.63, and 11.25 mg. on the control diet, and on the diets containing bread enriched with reduced iron, ferrous sulphate, and ferric phosphate (Table 1), respectively. Before calculating the iron content of the feces, the values for the first four-day collection period in each twenty-eight-day treatment period were omitted. Four days were found by Johnston, Ingalls, and Muka (5) to be long enough to dispose of lag from the preceding diet, if the change in level of iron intake is not large.

The increase in fecal iron after enrichment of the bread was used as a measure of the amount of iron which was not absorbed from the iron preparation incorporated into bread. This figure was subtracted from the amount of enriching iron to obtain the amount of iron absorbed from the iron preparation.

By this method of calculation, the mean amount

TABLE 1 **Twenty-four-day averages of daily intake and fecal excretion of iron for subjects during control and experimental periods**

SUBJECT	CONTROL DIET		REDUCED IRON		FERROUS SULPHATE		FERRIC PHOSPHATE	
	Intake	Feces	Intake	Feces	Intake	Feces	Intake	Feces
				Group 1				
	mg.	mg.	mg.	mg.	mg.	mg.	mg.	mg.
M	5.34	4.26	12.88	11.76	12.55	11.62	12.22	11.15
L	5.86*	5.18*	13.58	13.02	13.23	12.83	12.95	11.87
C	5.43	4.81	13.02	12.43	12.65	12.01	12.30	11.17
				Group 2				
B	5.35	4.45	12.81	11.78	12.70	11.14	12.25	11.55
G	5.32†	3.79†	12.84	10.87	12.73	10.50	12.24	11.21
D	5.26	4.71	13.04	12.54	12.90	12.47	12.25	12.37
				Group 3				
N	5.34	4.53	12.83	12.12	12.50	12.25	12.36	12.31
E	5.74	5.25	13.56†	12.51†	13.35	12.60	13.15	11.05
A	5.55	3.53	13.10†	10.60†	12.74	9.23	12.65	8.58
Mean.....	5.47	4.50	13.07	11.96	12.82	11.63	12.49	11.25

* Based on a sixteen-day average because of missing data.
† Based on a twenty-day average because of missing data.

of iron absorbed by nine subjects from reduced iron, ferrous sulphate, and ferric phosphate was 0.17, 0.23, and 0.31 mg. per day (Table 2) or 2, 3, and 4 per cent, respectively. The differences among the three iron preparations were small and obviously of no significance. The mean of 3 per cent absorbed from all three preparations was very small and would not have been that high except for two subjects who absorbed enough to raise the mean. This low percentage was due partly to a somewhat high absorption from the basal diet and partly to a somewhat low absorption from the enriched diets. This, then, raises the question of whether the ability of the subjects to absorb declined because of the increase in level of intake from the control to the experimental diets or whether the iron used for enrichment was poorly absorbed.

The best of all nine subjects from the standpoint of her even temperament and even physiologic behavior was Subject *M*. She was selected as the one whose results might be the most indicative. Her values were very similar to the mean for all subjects. She absorbed almost the same amount of iron on the control diet and the diets containing all three preparations. Therefore, she apparently absorbed no iron from the enriching preparations or else her ability to absorb iron was reduced to half when the total intake was increased. The authors are of the opinion that the increase in intake might have accounted for a little but certainly not all of the decrease in percentage of absorption.

If the failure of the subjects to absorb more iron on the intake of 12.79 mg. than on the 5.47 mg.-intake was due to a higher percentage of absorption on the low intake, there is no object in adding iron to a low-iron diet. Whether no iron is absorbed from enriching preparations or whether some is absorbed from them and some from the basal diet makes no difference from the practical viewpoint if the total iron absorbed is the same.

The negative values for Subject *N* (Table 2) for absorption of the iron preparations may have been due to a decline in ability to absorb. She was under the stress of responsibility for the experiment and became more tired and tense as time passed. The negative values for Subjects *L*, *D*, and *G* were probably also related to changes in their ability to absorb.

The percentage of iron absorbed from the entire diet can be calculated if correction is made in the values for fecal iron for the amount from gastro-intestinal sources. When the value of 0.2 mg. per day, reported by Ingalls and Johnston (6) for gastro-intestinal iron, is employed, the percentage of iron absorbed by the subjects from the whole diet, approximately half of which was furnished by enriching iron, was 10.2, 10.7, and 11.4 (Table 2) for diets containing bread enriched with reduced iron, ferrous sulfate, and ferric phosphate, respectively. The percentages are so similar that all three preparations were obviously equally good. The usual percentage on intakes of this magnitude as found in balance studies in this laboratory is about 10 to 15 per cent.

Using the value of 0.2 mg. for gastro-intestinal iron, the mean percentage absorbed from the control diet containing 5.47 mg. iron was 21.2. This was a higher value than one of 13.8 per cent found for ten subjects on an intake between 6 and 7 mg. by Johnston *et al.* (7) and McMillan and Johnston (8). None of the ten subjects absorbed as much as Subject *A* in this experiment, but even if the value for her is omitted, the percentage of absorption is somewhat high. Why the subjects of the present study absorbed unusually well from the control diet is not known. The control diet contained slightly less iron than the diet with which it has just been compared.

Possibly a higher proportion of people with a high absorbing ability was included in this group than in the other groups. This group was an older one made up of graduate students, a large proportion of whom had been subjected to stress for some years, while the ten subjects of the earlier report were undergraduates. As far as the authors know, the control diet contained nothing that would favor high iron absorption.

An examination of the values for individual subjects shows that Subject *A* absorbed unusually well. If the value of 0.2 mg. is used for iron from gastrointestinal sources, she absorbed 40 per cent on the control diet and 20.6, 29.1, and 33.8 per cent on the three enriched diets. This finding was unexpected because food remained in her digestive tract for a short time: the mean of twenty-eight expulsion times for Subject *A* was 14 hr. Eight months later the decision was made to determine the serum iron of the six subjects still available. Subject *A*'s serum iron was 186 mcg. per 100 ml. as compared with values for Subjects *L*, *C*, *N*, *E*, and *D* of 181, 97, 125, 162, 105 mcg., respectively. Her hemoglobin value was 13.8 gm. per 100 ml., a normal value. This evidence would lead to the conclusion that she was not absorbing a large amount of iron because of need. No investigation was made of her menstrual losses which might have been depleting her stores.

Subject *G* also absorbed well.No reason was known for her high rate of absorption. She was trained in nutrition and presumably her previous diet had not been deficient in iron. She had made no blood donations in the last few years. Nothing was known about her menstrual losses, but her hemoglobin values averaged 13.5 gm. per 100 ml. blood. The amount of iron absorbed by both Subjects *A* and *G* increased with time. This may have been fortuitous because only three values were concerned, but it makes one wonder whether they were adjusting to the diet or whether some psychologic condition was responsible.

Subjects *D* and *N* were the poorest absorbers. Early in the experiment the former developed a low recurrent fever; the latter was under the stress of responsibility for the experiment.

In unpublished work in this laboratory, Hoene (9) found that in some women the loss of fecal material and consequently of iron is increased at the menstrual period. Fortunately, in the case of Subject *L* whose fecal losses at the time of the menstrual period were large enough to be of importance, a menstrual period occurred in each treatment period.

Subject *E* was given sodium phosphate and biphosphate once during each of three treatment periods. The medicinal phosphate did not increase the amount of iron per gram of fecal dry-weight and, therefore, apparently did not interfere with iron absorption, provided the laxative did not also prevent the absorption of an equal proportion of organic matter. She absorbed best during the last treatment period when the bread was enriched with ferric phosphate (Table 2) and when she was given no medicinal phosphate. There was reason to believe that she was more relaxed near the end of the experiment when the bread was enriched with ferric phosphate.

TABLE 2 Iron absorbed from enriching iron added to bread and the percentage of iron absorbed from a diet containing bread enriched with iron

SUBJECT	IRON ABSORBED FROM ENRICHING IRON*			PERCENTAGE OF IRON ABSORBED FROM ENTIRE DIET†		
	Reduced iron	Ferrous sulphate	Ferric phosphate	Reduced iron	Ferrous sulphate	Ferric phosphate
Group 1‡						
	mg./day	*mg./day*	*mg./day*			
M	0.13	−0.01	0.17	10.2	9.1	10.4
L	−0.21	−0.30	0.39	5.5	4.6	9.9
C	0.01	0.17	0.70	6.1	6.6	10.8
Group 2‡						
B	0.30	0.68	−0.06	9.6	13.9	7.5
G	0.55	0.65	−0.40	18.0	17.5	10.0
D	−0.20	−0.39	−0.61	5.4	4.9	0.8
Group 3‡						
N	0.04	−0.36	−0.70	7.1	3.6	2.0
E	0.37	−0.02	1.26	9.2	7.0	17.5
A	0.56	1.67	2.01	20.6	29.1	33.8
Mean.	0.17	0.23	0.31	10.2	10.7	11.4

* Calculated as follows: The enriching iron minus the increase of iron in the feces after the addition of enriching iron.

† Calculated as follows: The difference between the iron in the diet and the iron in the feces minus 0.2 mg. for gastrointestinal iron, divided by the iron in the diet and multiplied by 100.

‡ Group 1 received the enrichment in the following order: ferrous sulphate, ferric phosphate, reduced iron; Group 2 in the following order: ferric phosphate, reduced iron, ferrous sulphate; Group 3 in the following order: reduced iron, ferrous sulphate, ferric phosphate.

Steinkamp, Dubach, and Moore (10) have published the results of a study similar to this on human subjects in which radio-iron was used. They studied the same iron preparations and in addition sodium ferric pyrophosphate. They found no differences in iron absorption from the four iron preparations. They found a mean of 5 per cent of enriching iron absorbed by twenty-two subjects. Two additional subjects, whose need for iron was high, as judged by recent blood donation or low serum iron, absorbed large amounts. Five per cent is close to the percentage for three found in the present experiment when all nine subjects, both poor and good absorbers, were included. However, 5 per cent is a normal absorption in studies with radio-iron, while 3 per cent

is a low absorption in balance studies in which normal absorption for young women usually lies between 10 and 15 per cent.

Summary

Nine young women were maintained for four periods of twenty-eight days each on a carefully controlled diet. The first four weeks, during which no iron enrichment was added to the bread, served as a control period. In each of the following three periods a different preparation was added. The preparations tested were ferric phosphate, ferrous sulphate, and reduced iron. The iron content of the feces and of duplicates of the food eaten by the subjects was determined.

There was no difference in the amount of iron absorbed from the three iron preparations commonly used for the enrichment of bread when they were incorporated into bread.

The picture was not as clear regarding the efficacy of all three preparations. Judged by the increase in fecal iron following the addition of enrichment to the bread, all were poorly absorbed by these normal subjects whose stores were normal as far as was known. While mean absorption was 3 per cent, the subjects varied widely in their ability to absorb, and even the 3 per cent was mainly due to two subjects who absorbed well. A normal percentage is from 10 to 15.

If the amount of iron absorbed from the entire diet in which about half the iron was supplied by enriching iron in the bread is calculated with the use of 0.2 mg. per day as the amount of iron from gastrointestinal sources, the mean percentage of absorption was 10.8. This percentage is only slightly less than that usually found in balance experiments when the intake of iron is about 12 to 13 mg. per day.

Possibly, people who have a real need for iron can absorb more from these preparations than the subjects of this study who, as far as was known, had good stores. The possibility exists that the two subjects who absorbed the best had poorer stores.

References

(1) VISEK, W. J., MONROE, R. A., SWANSON, E. W., AND COMAR, C. L.: Determination of endogenous fecal calcium in cattle by a simple isotope dilution method. J. Nutrition 50: 23, 1953.

(2) FOOD AND NUTRITION BD.: Recommended Dietary Allowances. Natl. Research Council Rep. & Circ. Series No. 129, 1948.

(3) ROBERTS, H. L., BEARDSLEY, C. L., AND TAYLOR, L. V., JR.: Determination of iron in liquid food products. Indust. & Engin. Chem., Anal. Ed. 12: 365, 1940.

(4) STUGART, R.: Determination of iron in milk and other biological materials. Indust. & Engin. Chem., Anal. Ed. 3: 390, 1931.

(5) JOHNSTON, F. A., INGALLS, R. L., AND MUKA, B. O.: The use of aa′-dipyridyl for determining the amount of ferrous iron formed in the digestive tract of women before and after the addition of beef to the diet. J. Nutrition 53: 83, 1954.

(6) INGALLS, R. L., AND JOHNSTON, F. A.: Iron from gastrointestinal sources excreted in the feces of human subjects. J. Nutrition 53: 351, 1954.

(7) JOHNSTON, F. A., FRENCHMAN, R., AND BOROUGHS, E. D.: The iron metabolism of young women on two levels of intake. J. Nutrition 38: 479, 1949.

(8) JOHNSTON, F. A., AND MCMILLAN, T. J.: Iron requirement of six young women. J. Am. Dietet. A. 28: 633, 1952.

(9) HOENE, A.-E.: The absorption of iron from bread enriched with reduced iron by nine young women, and the influence of the menstrual cycle upon absorption. Ph.D. dissertation, Cornell University, 1956.

(10) STEINKAMP, R., DUBACH, R., AND MOORE, C. V.: Studies in iron transportation and metabolism. 8. Absorption of radioiron from iron-enriched bread. Arch. Int. Med. 95: 181, 1955.

Two-Way Communication

. . . The administrator should be a person with large ears. There is much required listening. She listens to what is said and just as intently to what is not said. She listens to the individual, to groups, and to the institution. Effective listening requires a keenness of perception comparable to that of the maestro of a symphony orchestra. The wise executive can detect discord and undertone of tension in the incubation stage. Is it not by chance that the ears have been placed on the side of the head adjacent to the brain.

. . . Listening is one way of a two-way circulation. Communication is the lifeblood of an organization. Organizational anemia, paucity of communication, or complete occlusion is the etiology of most interpersonal difficulties. Having one's say is often more important than getting one's way. Committees may keep minutes and waste hours. However, frequent group discussions are essential to the normal functioning of an organization. After the discussion, put it in writing! This is a prescription which may be both curative and prophylactic for misunderstandings regarding directives, directions, decision, or just plain information. Verbal orders are unsafe for students, patients, and personnel; phone orders are lethal.—*Excerpted from "Addicted to Administration" by Maxine Atteberry. Nursing Outlook 5: 464 (August), 1957.*

Implications in Dietary Planning

Amino Acid Requirements of Adults[1]

MAY S. REYNOLDS, Ph.D.

Department of Foods and Nutrition,
School of Home Economics,
University of Wisconsin, Madison

Fortification of natural foods with amino acids to make them "adequate" in protein has been proposed in a number of quarters. Is such a procedure warranted in view of research findings on the requirements and recommended "safe" intakes of the various amino acids? Here is a review of current knowledge of the essential amino acid requirements of adult men and women.

ANY DISCUSSION of amino acid requirements should logically begin with the pioneer work of W. C. Rose who first presented both qualitative and quantitative requirements of young *men*. In 1949 (1), he first published the complete list of those requirements and only in the last two or three years have the details of those studies been made available (2, 3). They represent work that will stand as a classic in the history of protein nutrition.

Studies of the requirements of *women*, sponsored by the Department of Agriculture, have been made by Leverton *et al.* (4–8), by Swenseid and Dunn (9, 10), and in our own laboratories with the cooperation of Baumann (11–13). Much credit should be given to Leverton and her staff who did the first of this work with women and solved many of the problems which arose in connection with the preparation and administration of a semi-synthetic diet. They originated many of the plans which the other two laboratories followed. Some work on the requirements of infants has been reported by Holt and co-workers (14, 15). However, this discussion will be concerned very largely with the work on women.

Procedure

To understand the contribution made by these studies, as well as their limitations, it might be well to review the methods used. The general plan has been to provide generous amounts of the essential amino acids with enough additional nitrogen for the synthesis of the dispensable amino acids. Nitrogen balance has been used as the criterion of adequacy. When subjects were in balance on this diet, the amino acid for which the requirement was being studied was removed to produce a negative nitrogen balance and then replaced step-wise until balance again resulted. Plans in the different laboratories have varied slightly but fundamentally have been the same.

In more detail, the plan in our own laboratory was as follows: subjects were given a diet of ordinary foods for from eight to twelve days to accustom them to the routine of metabolism studies and to put them into nitrogen balance at the proposed level of intake, i.e., 10 gm. nitrogen. This was followed by a so-called transition period of three or four days during which the ordinary foods were gradually replaced by the synthetics. The semi-synthetic diet, used for the remainder of the study, was made up of a few low-protein fruits and vegetables for purposes of palatability, sucrose, butter oil, cornstarch, a vegetable oil, some carbonated beverages, a mineral and vitamin supplement, and agar for bulk. These foods furnished only 0.5 to 1 gm. nitrogen per day. Most of the nitrogen was provided by the eight essential amino acids and arginine, histidine, cystine, and tyrosine in the amounts contained in 20 gm. egg protein, plus glycine and diammonium citrate in iso-nitrogenous amounts sufficient to bring the total nitrogen to 10 gm., or an amount equivalent to a little over 60 gm. protein. This description of the diet gives some idea of the care involved in its preparation and of the sacrifices made by the subjects.

After the subjects were in nitrogen balance on this semi-synthetic diet, the amino acid under study was removed from the mixture and only the small amount in the ordinary foods was present in the diet. This resulted in definite nitrogen loss, demonstrating again the essential nature of the amino acid. The amino acid was then fed, usually in gradually in-

[1] Published with the approval of the Director, Wisconsin Agricultural Experiment Station. Presented at the 39th Annual Meeting of The American Dietetic Association in Milwaukee, on October 11, 1956.

creasing amounts, until the subject was in balance. As the amount of the amino acid was varied, the nitrogen was maintained at a constant level by the addition of suitable amounts of glycine. Calories were sufficient to maintain the weight of the subject throughout the study.

Discussion of Results

It is of interest that in most instances the change from the normal diet to the synthetic required a marked increase in caloric intake ranging from 13 to 33 per cent or an average of 18 per cent in our studies (13). These results are in agreement with a similar finding by Rose *et al.* (16).

The proposed requirements as determined by these studies are shown in Table 1.

The requirements for men, as determined by Rose, are higher than those found for women. It is interesting, however, that the quantitative relationships that the amino acids bear to one another are similar. In most cases, these values represent the minimum needs of subjects having the highest requirement for the maintenance of nitrogen balance. Rose advised that for safety, the amounts should be doubled (2).

These studies have furnished fundamental information and provide a starting point for further work. However, the tables of requirements have little practical application until we can interpret them in terms of the amino acid content of food. Rose suggests that "it should be possible to predict with reasonable accuracy how much of a given protein or diet, if its content of amino acids is known, would insure the maintenance of nitrogen equilibrium in the adult organism provided a sufficient supply of extra nitrogen to cover the synthetic needs of the cells is already present or is added to the food" (3).

Allison has suggested (17) that the ratios of the essential amino acids, as found in the requirements, be used to furnish the basis for a provisional or reference protein with which the amino acid content of dietary proteins can be compared. Before attempting to make this practical use of the data, the limitations should be recognized. Subjects studied have necessarily been limited in number and scope. Some groups, probably having higher requirements, have not been studied. The requirements for children beyond infancy, for reproduction, and for other functions of protein have not been included.

The conditions of these experiments should be carefully noted. Total calories in the diets were high enough for the subjects to maintain their weight. The effect of total energy intake on nitrogen utilization is so well recognized as to need little comment. That this effect may extend to the requirement for a specific essential amino acid, even with generous amounts of total nitrogen, may easily be possible.

The nitrogen was furnished largely as pure amino acids, with little ordinary food present. Little is known of the comparative physiologic availability and utilization from synthetic and natural food sources. In the matter of digestion, from our own data on fecal nitrogen, the loss of nitrogen was from 25 to 50 per cent less on the synthetic than on the normal diet at the same level of nitrogen intake. It is of some interest that the amino acids of the synthetic diet were apparently absorbed high in the gastro-intestinal tract, for even in cases of rather severe diarrhea, fecal nitrogen was not increased.

Amino acids were distributed in what we believe to be desirable proportions throughout the three meals of the day. This is a situation that frequently does not exist in the self-chosen diet.

Total nitrogen of the diet ranged from about 6 to 10 gm. However, Rose (18) has recently reported that with essential amino acids at the safe levels determined in his laboratory, it has been possible to maintain subjects in positive nitrogen balance on a total nitrogen intake of 3.5 gm. Of this amount, 1.42 gm. came from what he terms effective amino acids, 1.2 gm. from glycine, and the rest from ineffective

TABLE 1 Minimum amounts of essential amino acids required for maintenance of nitrogen balance in adults

ESSENTIAL AMINO ACID	WOMEN	MEN (1)
	gm.	gm.
Isoleucine	0.450 (10)	0.70
Leucine	0.620 (8)	1.10
Lysine	0.500 (12)	0.80
Phenylalanine	0.220 (7)	1.10
with tyrosine present	0.900	
Sulphur-containing amino acids	0.550 (9)	
Methionine	0.290 (13)	1.10
Cystine	0.250 (13)	
Threonine	0.310 (4)	0.50
Tryptophan	0.160 (6)	0.25
Valine	0.650 (5)	0.80

TABLE 2 Amino acid intakes of women on self-chosen diets (21)

ESSENTIAL AMINO ACID	INTAKE		
	Women in nitrogen balance	Women in negative nitrogen balance	Minimum requirements of women for essential amino acids
	gm./day	gm./day	gm./day
Isoleucine	1.62– 5.73	1.15– 4.88	0.450
Leucine	4.83– 7.35	3.37– 6.25	0.620
Lysine	3.25– 7.17	1.70– 5.85	0.400
Methionine	0.83– 2.54	0.67– 2.03	0.290
Cystine			(0.250)
Phenylalanine	2.88	1.53– 4.03	0.220
Tyrosine			(0.900)
Threonine	1.44– 3.44	0.97– 3.02	0.310
Tryptophan	0.44– 1.28	0.25– 0.91	0.160
Valine	3.20– 4.58	2.51– 5.98	0.650
Total nitrogen...	8.20–15.20	4.50–14.40	10.000

D forms or unknown forms. This amount of nitrogen is equivalent to about 22 gm. protein. This value was determined in a diet furnishing generous total calories and with what appears now to be an efficient ratio of amino acids. It can in no way be interpreted as evidence for the adequacy of low-protein reducing diets.

Now, what can we say regarding the application of these requirements to our own diets? The needs of the healthy adult for these amino acids, as shown by these studies, are low, suggesting that even in a relatively protein-poor diet, a deficiency of the essential amino acids as such is unlikely.

Data on the self-chosen diets of women reported by Futrell *et al.* (19, 20), by Reynolds *et al.* (21), and by Mertz and co-workers (22) have shown that these diets supply the essential amino acids in excess of the requirements for nitrogen balance. In Table 2, such data are shown both for women who were in nitrogen balance and for those who were excreting nitrogen in excess of intake. Comparisons are easily made with the proposed requirements. It seems obvious that the nitrogen loss in these cases was not specifically due to a deficiency of essential amino acids. In an earlier paper, we have pointed out the probable influence of total calories (21). There are other possible explanations for this large number of negative balances on self-chosen diets, but that is not the purpose of this paper. The amino acid composition of the "average American diet," as given by Block and Bolling (23), is presented in Table 3. It is obvious that there is no deficiency of amino acids in that diet. However, it represents a relatively high intake of protein and may mean little so far as many individual intakes are concerned.

TABLE 3 Essential amino acid content of the "average" American diet compared with the "safe" levels for men

ESSENTIAL AMINO ACID	"AVERAGE" AMERICAN DIET[23]	"SAFE" LEVELS FOR MEN[1]
	gm./day	*gm./day*
Isoleucine	4.2	1.40
Leucine	6.5	2.20
Lysine	4.0	1.60
Methionine	3.0	2.20
Phenylalanine	4.1	2.20
Threonine	2.8	1.00
Tryptophan	0.9	0.50
Valine	4.2	1.60

In Table 4 is shown the amino acid composition of some of the "good" proteins—the pattern that we often recommend to meet the protein requirement for a day. You will note that this "standard" portion of meat furnishes the Rose minima for men except for the sulphur-containing amino acids, methionine and cystine. This total meets the needs of women as determined in this laboratory.

Two eggs or 1 pt. of milk meet the requirements for all essential amino acids except methionine and cystine and tryptophan. However, we do not plan to obtain all of our amino acids from one source. If we follow the dietary pattern, often advised in this country, of including these three sources, we are furnishing all essential amino acids in excess of requirements and from about 40 to 50 gm. protein, without considering other dietary protein sources.

The figures indicate that there is little possibility of a deficiency of an essential amino acid as shown by nitrogen balance under carefully controlled conditions, and such data may tend to encourage us to plan low-protein diets. However, Rose (2) has pointed out that even the safe levels he has suggested are probably not *optimal.* Since we have as yet devised no method for the measurement of an optimal intake, the best procedure seems to be to meet the recommended allowances for protein.

The idea of fortifying some of the foods with the amino acids in which they are deficient is an intriguing one. However, at this time, it seems to be neither wise nor necessary. We do not depend on any *one* food as a source of amino acids. The supplementary values of vegetable proteins have been demonstrated by Hegsted (26), who points out there is little likelihood of a protein or an amino acid deficiency on such a diet. In our own experience, subjects maintained nitrogen balance on an all-vegetable diet furnishing from 25 to 30 gm. protein, with adequate calories (27).

In studies of lysine requirement, Clark and coworkers (28) used a basal diet which contained 159 gm. flour and 21 gm. cornmeal, quantities almost identical with the per capita consumption of these products in the United States. This flour and cornmeal, served as eight small biscuits and one serving of cornbread, supplied enough lysine to meet the requirements for two of their subjects and nearly so for two others. Any diet which includes even small amounts of lysine-rich proteins, such as meat, eggs,

TABLE 4 Essential amino acid composition of certain food proteins

FOOD	ISO-LEUCINE	LEUCINE	LYSINE	METHIO-NINE	CYSTINE	PHENYL-ALANINE	TYRO-SINE	THREO-NINE	TRYPTO-PHAN	VALINE
	gm.	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
100 gm. beef round	1.14	1.54	1.74	0.48	0.18	0.86	0.68	0.88	0.26	1.04
1 egg	1.53	0.61	0.60	0.60	0.16	0.42	0.30	0.31	0.10	0.49
1 pt. milk	1.10	1.55	1.21	1.21	0.10	0.95	1.05	0.61	0.15	1.25
Total	3.77	3.70	3.55	1.25	0.44	2.23	2.03	1.80	0.51	2.78
Minimum requirements for men (1)	0.70	1.10	0.80	1.10	—	1.10	—	0.50	0.25	0.80

or milk, in addition to these cereals should provide an adequate quantity of lysine.

It should be further pointed out that in adding a single amino acid to a food when we have little or no information on the physiologic utilization of the amino acids present in the food, we may create an imbalance of amino acids and do more harm than good. Such imbalances have been demonstrated by Elvehjem and co-workers (29). In a statement on the "Supplementation of Dietary Proteins with Amino Acids" adopted in October, 1956 by the Food and Nutrition Board of the National Research Council (30), they say that "the benefits to be derived from amino acid supplementation are uncertain until our knowledge of the consequences of amino acid imbalance is more complete." Until we have more information, then let us proceed with caution in the application of these amino acid requirements to the fortification of foods. We do not need the added amino acids. Let us not shake the faith of our public in our good foods and open the door for the faddists and conveyors of food misinformation.

Summary

We have presented the requirements of the essential amino acids for the maintenance of nitrogen balance in adult men and women. The limitations of these studies have been pointed out, as have certain precautions in their application to conditions other than those of the experiments. These studies have established a starting point for further investigations.

References

(1) Rose, W. C.: Amino acid requirements of man. Federation Proc. 8: 546, 1949.

(2) Rose, W. C., Lambert, G. F., and Coon, M. J.: The amino acid requirements of man. 7. General procedures; the tryptophan requirement. J. Biol. Chem. 211: 815, 1945.

(3) Rose, W. C., Wixom, R. L., Lockhart, H. B., and Lambert, G. F.: The amino acid requirements of man. 15. The valine requirement; summary and final observations. J. Biol. Chem. 217: 987, 1955.

(4) Leverton, R. M., Gram, M. R., Chaloupka, M., Brodovsky, E., and Mitchell, A.: The quantitative amino acid requirements of young women. 1. Threonine. J. Nutrition 58: 59, 1956.

(5) Leverton, R. M., Gram, M. R., Brodovsky, E., Chaloupka, M., Mitchell, A., and Johnson, N.: The quantitative amino acid requirements of young women. 2. Valine. J. Nutrition 58: 83, 1956.

(6) Leverton, R. M., Johnson, N., Pazur, J., and Ellison, J.: The quantitative amino acid requirements of young women. 3. Tryptophan. J. Nutrition 58: 219, 1956.

(7) Leverton, R. M., Johnson, N., Ellison, J., Geschwender, D., and Schmidt, F.: The quantitative amino acid requirements of young women. 4. Phenylalanine, with and without tyrosine. J. Nutrition 58: 341, 1956.

(8) Leverton, R. M., Ellison, J., Johnson, N., Pazur, J., Schmidt, F., and Geschwender, D.: The quantitative amino acid requirements of young women. 5. Leucine. J. Nutrition 58: 355, 1956.

(9) Swendseid, M. E., Williams, I., and Dunn, M. S.: Amino acid requirements of young women based on nitrogen balance data. 1. The sulfur-containing amino acids. J. Nutrition 58: 495, 1956.

(10) Swendseid, M. E., and Dunn, M. S.: Amino acid requirements of young women based on nitrogen balance data. 2. Studies on isoleucine and on minimum amounts of the eight essential amino acids fed simultaneously. J. Nutrition 58: 507, 1956.

(11) Jones, E. M., Baumann, C. A., and Reynolds, M. S.: Methionine and lysine requirements of mature women. Federation Proc. 14: 438, 1955.

(12) Jones, E. M., Baumann, C. A., and Reynolds, M. S.: Nitrogen balances of women maintained on various levels of lysine. J. Nutrition 60: 549, 1956.

(13) Steel, D.: Studies of certain factors affecting methionine requirement. Unpublished Ph.D. thesis, Univ. of Wis., 1956.

(14) Pratt, E. L., Snyderman, S. E., Cheung, M. W., Norton, P., Holt, L. E., Jr., Hansen, A. E., and Panos, T. C.: The threonine requirement of the normal infant. J. Nutrition 56: 231, 1955.

(15) Snyderman, S. E., Pratt, E. L., Cheung, M. W., Norton, P., Holt, L. E., Jr., Hansen, A. E., and Panos, T. C.: The phenylalanine requirement of the normal infant. J. Nutrition 56: 253, 1955.

(16) Rose, W. C., Coon, M. J., and Lambert, G. F.: The amino acid requirements of man. 6. The role of the caloric intake. J. Biol. Chem. 210: 331, 1954.

(17) Allison, J. B.: Evaluation of dietary proteins. Nutrition Rev. 14: 129, 1956.

(18) Rose, W. C., and Wixom, R. L.: The amino acid requirements of man. 16. The role of the nitrogen intake. J. Biol. Chem. 217: 997, 1955.

(19) Futrell, M. F., Lutz, R. N., Reynolds, M. S., and Baumann, C. A.: Studies on amino acids in self-selected diets. J. Nutrition 46: 299, 1952.

(20) Futrell, M. F.: Studies on amino acids in self-selected diets. Unpublished Ph.D. thesis, Univ. of Wis., 1952.

(21) Reynolds, M. S., Futrell, M. F., and Baumann, C. A.: Nitrogen balances and amino acid content of self-selected diets of women. J. Am. Dietet. A. 29: 359, 1953.

(22) Mertz, E. T., Baxter, E. J., Jackson, L. E., Roderuck, C. E., and Weis, A.: Essential amino acids in self-selected diets of older women. J. Nutrition 46: 313, 1952.

(23) Block, R. J., and Bolling, D.: The Amino Acid Composition of Proteins and Foods. 2nd ed. Springfield, Ill.: Charles C Thomas, 1951.

(24) Alexander, J. C., and Elvehjem, C. A.: Isolation and identification of nitrogenous components in meat. J. Agric. & Food Chem. 4: 708, 1956.

(25) Futrell, M. F.: Unpublished data.

(26) Hegsted, D. M., Trulson, M. F., and White, H. S.: Lysine and methionine supplementation of all-vegetable diets for human adults. J. Nutrition 56: 555, 1955.

(27) Linkswiler, H.: Studies on the metabolism of vitamin B_6 and of protein in human subjects and in rats. Unpublished Ph.D. thesis, Univ. of Wis., 1951.

(28) Clark, H. E., Mertz, E. T., Kwong, E. H., Howe, J. M., and DeLong, D. C.: Amino acid requirements of men and women. 1. Lysine. J. Nutrition, in press.

(29) Elvehjem, C. A.: Amino acid balance in nutrition J. Am. Dietet. A. 32: 305, 1956.

(30) Comm. on Amino Acids: Statement on supplementation of dietary proteins with amino acids. Proc. Food & Nutrition Bd. 16: 41, 1956.

II. Children from Two Areas—Jungle and Coastal

Growth and Development of Peruvian Children[1]

MARTHA F. TRULSON, D.Sc.
CARLOS COLLAZOS CH., M.D.
and D. MARK HEGSTED, Ph.D.[2]

Department of Nutrition, Harvard School of Public Health, Boston; Departamento de Nutrición, Ministerio de Salud Publica y Asistencia Social, Lima, Peru; and International Cooperation Administration, Institute of Inter-American Affairs, Division of Health, Welfare and Housing, Lima, Peru

THE DEPARTMENT of Nutrition at Harvard's School of Public Health, in cooperation with the Department of Nutrition of the Ministry of Health in Peru and The Servicio Cooperativo Interamericano de Salud Publica, has, for the past six years, been developing a nutrition program that will meet the needs of Peru.

The planning of a sound nutrition program in any country should include the study of groups within the population so that programs which are developed will emphasize the greatest needs. The needs may change and re-evaluation of the program may alter the emphasis. For example, in the United States, the most recent group under scrutiny healthwise is the adult male because of the high incidence of coronary heart disease in this segment of the population and because of the great interest in the problem in this and other western countries. In less industrialized nations and in areas where economic resources as yet are not so highly developed as in our own, the child is the vulnerable member of the population and the public health program is often geared to better his condition. Among the investigations undertaken in Peru is a study of the growth and development of the children in the three areas of Peru—coastal, jungle, and mountainous.

While each child has his own individual growth pattern, environmental influences may prevent him from reaching his growth potential or may influence the rate of growth, although the potential may ultimately be reached. One way to study this problem is a longitudinal study of the same children from birth to adulthood, such as the Growth Study of the Maternal and Child Health Department at Harvard. (1) Another method would be to obtain information from children of various age, economic, and racial groups from contrasting sections of a country and compare them with standards and with each other.

In many countries, post-weanling children are the most vulnerable persons but, since they are not congregated in one area and the sample found at a health center would not necessarily be typical, it is much easier although less important to study school-age children. Considerable data have been published which associate higher living standards with either ultimate increase in body size or more rapid development (2, 3). This paper describes the growth of three groups of Peruvian children, two living in a tropical region but contrasted in economic resources, and the other living in a rural coastal area. The coastal children have been previously described but are included here for comparative purposes (4).

Materials

The children of the jungle region lived in Iquitos, a city of 78,000, which is the principal city of the Departamento of Loreto and the most important Peruvian port for the Amazon and its tributaries. It has a tropical climate with very little seasonal differences in climate except for variation in rainfall. During World War I, it was strategic because

[1] Supported in part by a contract between the International Cooperation Administration (Institute of Inter-American Affairs) and Harvard University; a grant-in-aid from the E. I. duPont de Nemours and Company, Wilmington, Delaware; and the Fund for Research and Teaching, Department of Nutrition, Harvard School of Public Health. Received for publication January 22, 1957.

[2] Dr. Idell Pyle provided valuable advice in assessment of the roentgenograms. Janet Buckingham and Patricia Stefanik assisted in preparation of the statistical material. The authors are also indebted to Drs. Jorge Atkins, Armando Lara, and Felix Arrieta, Health Department of Iquitos; the school teachers of Iquitos; and Irma Moscoso of the Departamento de Nutrición de Ministerio de Salud Publica y Asistencia Social, Lima, Peru.

of crude rubber, and since that time its chief export products have been lumber, skins, and some jungle products. Small home industry, such as dress making, tailoring, shoe making, and trading products from jungle farms, comprises much of the commerce. The city itself presents a village aspect. Within the city there are only a few blocks of paved road, and, electricity is available only in some sections. There is a potable water supply, but many homes have no running water. Adequate sewage disposal exists in only part of the city. The life of the city is centered on the river. Indeed, air travel and river travel are the two means of maintaining contact with the rest of Peru, since roads as we know them and railroads are non-existent.

As a part of the over-all study of nutritional problems of Iquitos, a nutritional survey of forty families whose children attended a public school was undertaken. The average size of these families was 7.5 persons. Their homes generally were of wood, the floors of dirt, and roofs of palm leaves, although there were a few brick homes. The families studied usually had two rooms, one for cooking and the other for living. Half of the families had plumbing in their houses and half had electricity. Though many people owned shoes, there was a reluctance on the part of the public school children to wear them. Often the shoes were worn out and literally useless.

The average cash value of the food consumed by the family was $1.25 per day. Since much of the food had to be imported and distributed over vast distances, some food prices were high. Fish is plentiful and cheap some seasons of the year. Bananas are plentiful, but other fruits and vegetables may be at times very scarce. Canned goods are imported and too expensive for the majority of families.

Breakfast consisted of coffee with bread; occasionally fried fish was used. Lunch was soup with or without meat stock, cooked banana, rice, beans, and fried fish. If some of the lunch was left, it was eaten for supper; otherwise the family had tea or coffee and bread. Fruit was used when available. A detailed description of the diet may be found elsewhere (5).

The nutritional needs of the family were estimated by knowing the family composition, age, and weight, and were adjusted for environmental temperature and compared with recommendations developed by the Food and Agriculture Organization (6) and National Research Council (7). Less than 50 per cent of the standard was considered poor, 50 to 74 per cent fair, 75 to 99 per cent good, and more than 100 per cent was called "more than 100 per cent" for lack of a better name. Half of the families were in the poor and fair categories in calories, protein, thiamine, ascorbic acid, and vitamin A. Riboflavin and calcium intakes were in the poor to fair groups in 90 per cent of the cases. Niacin and iron were consumed in relatively large amounts by two-thirds of the families, but the other third were in the fair grouping. Deficiencies in the diet were usually multiple. On an average, 12 per cent of the calories came from protein, 14 per cent from fat, and 74 per cent from carbohydrate.

No dietary survey of private school children's families (San Agostino for boys, Sagrado Corazon for girls) was done. While many of these families could not be considered wealthy, they were of the professional class or owned the larger stores. The private school children wore shoes, had plumbing facilities in their homes, floors of wood or tile, and had more available food. The children were in the main mestizoes, a mixture of Indian and European. Naturally, the predominance of one race or another varied.

Carquín and San Nicolás, the villages where the coastal children lived, have been described by Collazos *et al.* (8). Though the diets of these families varied considerably, several nutrients were consumed in amounts less than the recommended quantities. Ninety-five per cent of the families were graded poor for calcium and riboflavin and fair for thiamine and vitamin A. About 20 per cent consumed less than 75 per cent of the recommended amount of protein. The other nutrients were in the good or over 100 per cent group. The coastal area has a mean temperature of 20°C. There is for all practical purpose no rainfall. The arable land is a result of irrigation.

A total of 275 children from Iquitos, 106 boys and 169 girls, participated in the study. These children are compared with 109 coastal public school children, 58 boys and 51 girls. Of the Iquitos children, 48 boys were from a public school and 58 from San Agostino, a private school; of the girls, 116 were from a public school and 53 from the private school.

Procedure

The children were weighed and measured for height without outer clothing or shoes. Roentgenograms were taken of the left hand and wrist. Ages were obtained from the school record.

Heights and weights of children less than thirteen years of age were plotted on the Stuart percentile charts (9) and the Wetzel grid (10). Each osseous center of the hand was assessed, according to the standards of Greulich and Pyle, and the mean skeletal age was determined (11). Differences (retardation or advancement) in months of the mean skeletal age and chronologic age were calculated. Differences in height and weight were determined by subtracting these from the corresponding height or weight at the same age from the 50th percentile lines of the Stuart chart. Relative height and weight were obtained by dividing the actual height and weight by the 50th percentile height and weight. Relative Wetzel developmental age and relative skeletal age were determined by their relationship

to chronologic age. The data were tabulated for each sample and for those under nine and over nine years of age. The groups were compared, and various relationships were studied.

Results

The height and weight of the Iquitos children placed on the Stuart percentile chart showed considerable difference between the public and private school groups (Fig. 1). For children who had passed their thirteenth birthday, the Stuart and Meredith measurements were used (12). Forty-three of the 47 public school boys were below the 3rd percentile line in height. No public school boy was in the 50th percentile or over in height. In contrast, 20 per cent of the San Agostino boys were below the 3rd percentile in height and 46 per cent were above the 50th percentile. More San Agostino boys under nine were above the 50th percentile than those over nine—18 of the 24 younger boys as compared to 4 of the 24 older boys. About half of the coastal boys were below the 3rd percentile line, and only 3 were above the 50th percentile.

The weight division of the charts showed that two-thirds of the public school boys were below the 3rd percentile; none were above the 50th percentile. One private school boy was below the 3rd percentile for weight and about half were above the 50th percentile. Two-thirds of the boys under nine and half of the boys over nine were above the 50th percentile; again, a higher percentage of younger boys were above the 50th percentile than the older boys. Eight coastal boys (18 per cent) were below the 3rd percentile and about a third above the 50th percentile for weight.

The Iquitos girls presented a similar picture. Sixty per cent of the public school girls were below the 3rd percentile and 37 per cent were between the 3rd and 10th percentile in height. One public school girl was over the 50th percentile in height. In the private girls' school, one girl was below the 3rd percentile in height and 30 per cent were above the 50th percentile. Sixty per cent of the public school girls were below the 3rd percentile in weight, and 3 girls were above the 50th percentile for weight. Only one private school girl was below the 3rd percentile in weight, and 40 per cent were above the 50th percentile. Of the coastal girls, 20 per cent were below the 3rd percentile in height and 6 per cent were below it for weight. One child was above the 50th percentile in height and 8 were above in weight.

Table 1 consists of the mean and standard deviations of the actual differences in height and weight from the Stuart 50th percentile figures, months differences from the chronologic age and skeletal age or Wetzel developmental age, and the same data expressed as percentages or relative figures. Statistical evaluation of the various measurements demonstrate the following.

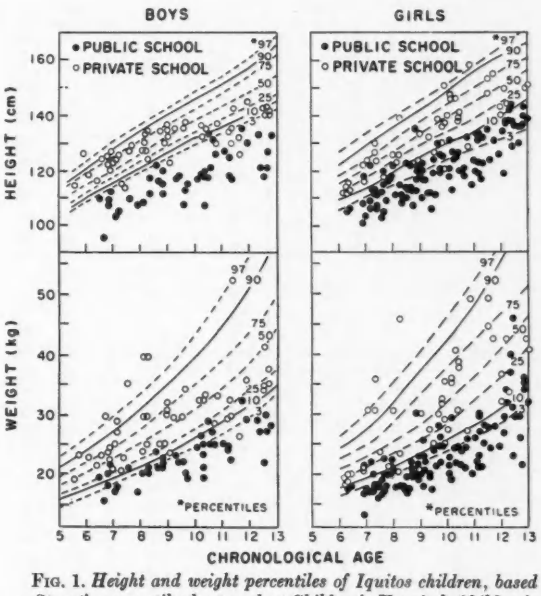


FIG. 1. *Height and weight percentiles of Iquitos children, based on Stuart's percentile chart used at Children's Hospital, Children's Medical Center, Boston.*

(*a*) The private school children (boys and girls) from Iquitos were taller, heavier, and more advanced according to Wetzel developmental age than the public school children from Iquitos or the coastal schools ($P = 0.01$ or less).

(b) Private school boys were more advanced in skeletal development than were the public school boys from Iquitos or the coastal boys ($P = 0.01$).

(c) Private school girls were more advanced in skeletal development than public school girls from Iquitos ($P = 0.01$), but were not more advanced than the coastal girls.

(d) Coastal boys and girls were taller, heavier, and more advanced in Wetzel developmental age and skeletal development than the public school children from Iquitos ($P = 0.01$).

(e) Boys from the three groups who were less than nine years of age were relatively taller, heavier, and more advanced in Wetzel developmental age than were the boys over nine years of age.

(f) Though girls under nine tended to be relatively taller, heavier, and advanced in Wetzel developmental age than girls over nine, the differences were not significant except in one instance; private school girls under nine were more advanced in Wetzel developmental age than the older girls ($P = 0.01$).

(g) Iquitos public school boys and girls over nine had relative skeletal ages more advanced than those of the children less than nine years of age. There were no statistical differences in the relative skeletal ages for the children under or over nine years of age in the private school or coastal groups.

(h) Comparisons of boys and girls within their own

TABLE 1 **Means and standard deviations of measurements for children of Iquitos and the coastal area**

MEASUREMENT	IQUITOS CHILDREN						COASTAL CHILDREN		
	Public school children			Private school children					
	Total	Under 9 years old	Over 9 years old	Total	Under 9 years old	Over 9 years old	Total	Under 9 years old	Over 9 years old
Boys									
Relative height (height as % of Stuart's 50th percentile)	85.8 ± 4.7	88.4 ± 3.5	84.4 ± 4.7	98.1 ± 5.8	102.7 ± 3.1	95.1 ± 5.3	92.4 ± 6.1	94.5 ± 5.4	88.9 ± 5.4
Height difference (height less Stuart's 50th percentile-cm.)	−19.9 ± 7.7	−14.6 ± 4.5	−22.9 ± 7.5	−3.4 ± 8.3	1.8 ± 4.7	−7.0 ± 8.1	−10.7 ± 8.8	−6.9 ± 5.7	−15.9 ± 5.4
Relative weight (weight as % of Stuart's 50th percentile)	74.8 ± 9.4	81.3 ± 7.5	71.0 ± 8.7	104.0 ± 17.8	111.8 ± 18.8	98.3 ± 14.7	90.4 ± 13.0	94.5 ± 12.9	86.4 ± 13.1
Weight difference (weight less Stuart's 50th percentile—kg.)	−8.7 ± 5.1	−4.6 ± 1.8	10.9 ± 4.9	0.6 ± 5.6	2.8 ± 4.5	−1.0 ± 5.3	−2.9 ± 9.5	−1.5 ± 2.9	−4.5 ± 4.5
Relative skeletal age (skeletal age as % of actual age)	70.9 ± 12.4	64.8 ± 10.8	72.9 ± 12.3	95.1 ± 10.2	95.4 ± 12.1	95.9 ± 8.5	89.5 ± 12.0	88.0 ± 12.3	90.6 ± 11.7
Skeletal age difference (skeletal age less actual age—months)	−35.6 ± 15.5	−32.1 ± 9.0	−37.5 ± 17.8	−3.4 ± 11.7	−3.1 ± 12.1	−3.5 ± 13.0	−11.3 ± 12.7	−10.5 ± 10.5	−12.3 ± 14.8
Relative Wetzel age (Wetzel age as % of actual age)	77.3 ± 9.7	82.5 ± 8.9	74.5 ± 8.8	107.0 ± 15.7	117.1 ± 17.6	99.8 ± 9.4	94.4 ± 14.4	99.2 ± 15.2	89.4 ± 12.0
Wetzel age difference (Wetzel age less actual age—months)	−28.4 ± 14.6	−16.0 ± 8.1	−34.0 ± 13.0	5.1 ± 16.7	12.2 ± 16.2	−1.4 ± 13.7	−7.5 ± 15.6	−1.8 ± 13.5	−13.7 ± 13.6
Number of subjects	48	17	31	58	24	34	58	30	28
Girls									
Relative height (height as % of Stuart's 50th percentile)	87.4 ± 5.6	90.5 ± 4.9	86.2 ± 5.7	98.8 ± 4.8	99.5 ± 3.8	98.4 ± 5.2	91.8 ± 5.1	92.6 ± 4.3	91.4 ± 4.9
Height difference (height less Stuart's 50th percentile—cm.)	−16.9 ± 7.1	−12.8 ± 6.3	−8.8 ± 7.2	−2.2 ± 6.9	−0.7 ± 4.8	−2.9 ± 7.6	−11.1 ± 4.8	−9.3 ± 4.9	−12.1 ± 7.0
Relative weight (weight as % of Stuart's 50th percentile)	74.2 ± 12.1	76.3 ± 9.8	72.3 ± 12.8	100.6 ± 20.7	106.9 ± 27.5	97.6 ± 15.6	88.1 ± 14.1	91.6 ± 12.9	87.3 ± 11.3
Weight difference (weight less Stuart's 50th percentile—kg.)	−9.9 ± 4.2	−9.2 ± 2.2	−10.7 ± 5.4	−0.3 ± 6.5	1.6 ± 7.3	−1.2 ± 5.9	−3.5 ± 3.4	−2.4 ± 2.7	−3.7 ± 3.9
Relative skeletal age (skeletal age as % of actual age)	79.6 ± 15.4	72.3 ± 13.9	84.1 ± 14.3	96.7 ± 12.3	92.2 ± 13.3	98.9 ± 11.2	94.3 ± 9.0	93.1 ± 10.5	94.9 ± 7.9
Skeletal age difference (skeletal age less actual age—months)	−23.6 ± 16.0	−25.7 ± 14.5	−22.0 ± 19.5	−4.1 ± 13.7	−7.5 ± 11.5	0.3 ± 14.0	−7.1 ± 9.8	−6.6 ± 10.1	−7.4 ± 9.6
Relative Wetzel age (Wetzel age as % of actual age)	77.5 ± 10.4	80.5 ± 10.6	75.7 ± 9.9	99.8 ± 16.3	110.1 ± 20.1	94.9 ± 11.3	91.1 ± 11.1	93.3 ± 17.6	87.4 ± 16.2
Wetzel age difference (Wetzel age less actual age—months)	−27.6 ± 13.8	−21.0 ± 10.3	−32.6 ± 13.4	−3.0 ± 19.4	−8.6 ± 19.6	−8.6 ± 16.6	−10.5 ± 11.3	−6.3 ± 11.9	−12.7 ± 10.2
Number of subjects	116	44	72	53	17	36	51	18	33

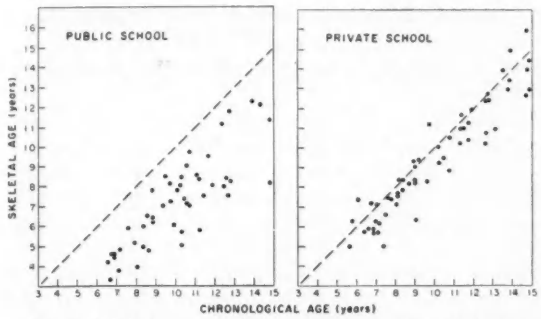


FIG. 2. *Skeletal vs. chronologic age of Iquitos boys. Skeletal age as determined by method of Greulich and Pyle (11); chronologic age to the nearest month as determined by school records.*

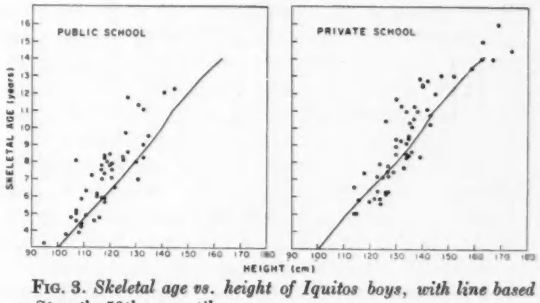


FIG. 3. *Skeletal age vs. height of Iquitos boys, with line based on Stuart's 50th percentile.*

school revealed no differences in relative measurements of height, weight, or Wetzel development. Skeletal age was more advanced for Iquitos public school and coastal girls than for Iquitos public school or coastal boys. Private school boys and girls did not show differences in relative skeletal development.

The differences in height, weight, and skeletal age of the public and private school children of the same area of Iquitos were most impressive. For example, Iquitos public school boys had a mean difference in height from the Stuart 50th percentile of -19.9 ± 7.7 cm. and the private school of -3.4 ± 8.3. Relative heights were 85.8 per cent $\pm$ 4.7 and 98.1 $\pm$ 5.8. Weight differences from the Stuart 50th percentile were -8.7 ± 5.1 kg. for public school boys and 0.6 ± 5.6 for the private school boys with relative weights of 74.8 per cent $\pm$ 9.4 and 104.0 per cent $\pm$ 17.8. Iquitos public school boys had a mean difference in months between chronologic age and skeletal age of -35.6 ± 15.5 months and private school boys of -3.4 ± 11.7 months. Relative skeletal age of the public school boys was 70.9 per cent $\pm$ 12.9 and for the private school boys of 95.1 ± 10.2.

Figure 2 shows the skeletal ages of the public and private school boys in relation to chronologic age.

Wetzel Grid

Table 2 shows the physical channel ratings according to the Wetzel Grid. This grid takes height and weight into consideration but not age. Channels A_2, A_3, and A_4 are considered stocky to obese; A_1 and B_1, average; and B_2, B_3 and B_4, thin. Forty per cent of the Iquitos public school boys, 22 per cent of the private school boys, and 44 per cent of the coastal boys were in the A_2 to A_4 channels. More than 50 per cent of the three groups were in the medium channel and less than 10 per cent of any group were considered thin. Iquitos public school girls had 14 per cent in the stocky channels, private school girls had 17 per cent, and coastal girls, 35 per cent. Fifty per cent of the girls were in the normal channels; and 12 per cent of the public school, 24 per cent of the private school, and 10 per cent of the coastal girls were in the "thin" channels.

TABLE 2 Wetzel Grid channel distribution of Iquitos and coastal children

CHANNEL	NUMBER OF BOYS			NUMBER OF GIRLS		
	Iquitos		Coastal village	Iquitos		Coastal village
	Public school	Private school		Public school	Private school	
A_4	1	6	4	5	3	5
A_3	11	0	8	3	4	5
A_2	8	7	14	8	2	8
A_1	7	13	16	19	7	15
				25		8
m	11	18	9		14	
B_1		9	4	31	10	5
	8					
B_2		3	2	9	10	4
	1					
B_3	0	2	1	3	3	0
B_4	1	0	0	3	0	1
Total.....	48	58	58	116	53	51

Interrelation of Measurements

As the public school children of Iquitos showed such consistent retardation in the four measurements when compared with the private school children of the same town, it was of interest to observe the relationships of measurements within the same schools. Figure 3 depicts the relationship of skeletal age and height in the public and private schools, while Figure 4 shows skeletal age in relation to weight. Both interrelationships demonstrate that the public school boys tend to have advanced skeletal development when compared with height and weight. In the private schools, the older children were relatively shorter than the younger children, and the skeletal age seemed to show advancement in height in the former group. It might be that skeletal development has priority over growth in height and weight, and when environmental conditions are unfavorable, this priority can be demonstrated. This same tendency was reported in the study of coastal children (4).

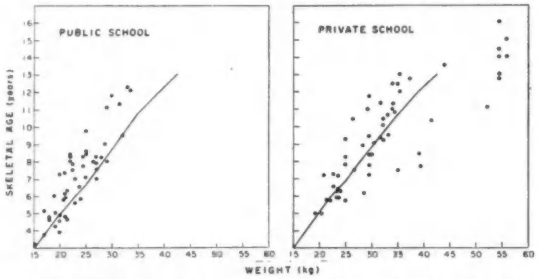


FIG. 4. *Skeletal age vs. weight of Iquitos boys, with line based on Stuart's 50th percentile.*

Coefficient correlations of the variables were calculated according to the method used in the previous study (13). As was expected, the various measurements are interrelated. Table 3 gives the correlation coefficients for the Iquitos girls. The only relationship within the realm of predictability was that of Wetzel developmental age and relative weight. When partial correlations were tabulated, this high degree of relationship persisted. The correlation of skeletal age with any of the other three variables was comparatively poor in all cases. The boys showed similar interrelationships.

TABLE 3 Correlations between measurements for Iquitos girls

VARIABLES*	PRIVATE SCHOOL	PUBLIC SCHOOL	VARIABLES*	PRIVATE SCHOOL	PUBLIC SCHOOL
12	.45	.57	23	.70	.76
12.3	.13	.53	23.1	.61	.74
12.4	−.25	.24	23.4	.08	.54
12.34	−.25	.31	23.14	.12	.55
13	.53	.32	24	.92	.94
13.2	.33	−.21	24.1	.90	.91
13.4	.20	−.05	24.3	.83	.90
13.24	.21	−.23	24.13	.84	.87
14	.57	.53	34	.74	.66
14.2	.46	−.04	34.1	.63	.61
14.3	.32	−.45	34.2	.32	−.23
14.23	.39	−.09	34.12	.23	−.21

* Variables:
1 = relative skeletal age
2 = relative Wetzel developmental age
3 = relative height (% or Stuart's 50th percentile)
4 = relative weight (% of Stuart's 50th percentile)

Discussion

Studies of child growth may help clarify the influences of environmental factors, such as nutrition and disease. The data present only a small segment of the population but suggest contrasting growth patterns between and within the areas and between the age groups of each sample.

The employment of North American height and weight percentile standards on Peruvian children can be justified, since these standards are used to compare Peruvian children with each other and not necessarily with a group of North Americans. It is of interest that the private school boys generally follow the height standard of North American standards until the ninth year but are shorter at older ages. Private school girls also seemed to fit reasonably into the Stuart standards: However, 40 per cent of the younger girls were above the 50th percentile in height and in the older group only 22 per cent were above the 50th percentile. Weight showed variation among the individuals but seemed to follow the Stuart scale reasonably well. The public school children and the coastal children were far lower in height and weight than would be expected in a normal North American population. The younger boys in all groups (ages five to nine) were relatively heavier and taller than the older children (nine to fifteen years). One might speculate that this is a growth pattern common to the Peruvian boy and perhaps the North American chart may be used with confidence for the Peruvian boy prior to puberty but not for older children. While girls tended to be shorter and less heavy in the older group, the differences were not significant. The normal North American child may progress at the beginning of puberty at a faster rate than the normal well fed Peruvian, and it is at this point that the growth pattern of the North American and Peruvian deviates. Ossification in the Iquitos public school and the coastal schools showed more delay for boys than for girls. It has previously been reported that boys may be more sensitive than girls to unfavorable environment (14).

The skeletal development did not follow the pattern of height and weight. The skeletal age of the coastal and private school children showed the same relation to chronologic age in both the younger and older group. In Iquitos, public school children of the older age group had a higher relative skeletal age than did the younger children. This again might mean that skeletal maturation has priority, and that height and weight occupy a secondary position in development.

The comparison of the hand and wrist standards of the North American child to the Peruvian child may be open to criticism. It has been suggested that the North American child's early occupation with toys has developed manual dexterity and thus a more highly developed hand than a child of similar age in a country where toys are not used extensively (15). If that assumption is correct, then one could assume that the private school children might, because of their favored economic situation, have more toys than the public school children of either area, and this in some measure may account for the differences between the skeletal ages of the children when the hand and wrist are assessed. However, there is no reason to think that the coastal children are more privileged than the Iquitos public school children,

and the former group had a mean ten-month retardation while the latter was retarded approximately three years. Perhaps the sequence of development of osseous centers may show racial characteristics, and a change in sequence of the appearance of ossification centers may account for some of the differences between the Peruvian and North American children. There seemed to be a consistent lag in the development of the ulnar epiphysis of the coastal and public school children, although this was not so frequently encountered in the private school children. Comparative studies of other osseous centers could be made to help determine the difference in developmental rate and the tabulation of each center for large groups, and a standard for Peru might thus be developed.

Nutrition may be an important influence in osseous development as demonstrated by investigators who have reduced retardation by two or more years during one year of improved nutrition (16). Individual dietaries of the children in the study were not obtained, but the studies from public school families in both Iquitos and the coastal area revealed diets below standards for many nutrients, with many families from Iquitos consuming diets inferior to the coastal average. One may also assume that the private school children had diets superior to either of the other two groups. However, the differences in skeletal development between the private school boys and Iquitos public school boys were far greater than between the Iquitos private school boys and those from the coast, and differences between the private school girls and coastal girls were not significant. Whether these deviations between the two public schools were due to nutritional variations, to other environmental factors such as parasitosis and the resulting anemia, or to multiple factors should be further studied—or whether reducing the anemia with iron therapy or an iron enrichment program would in itself be enough to significantly augment growth and development might be investigated.

Parasite counts were made on 116 public school girls and revealed 100 per cent parasitosis with an 82 per cent incidence of hookworm (17). Hemoglobin levels were correspondingly low. While there is certainly no complete lack of parasitosis with the private school children, there is less contact with the infecting agent as the boys wear shoes and live in homes with wooden or tile floors. The incidence of parasitosis is much less important than the relative severity of the infestation. It is likely that the severity is partly dependent on the nutritional state (18).

The place of the children on the Wetzel grid gives the impression that the Iquitos public school boy who is actually a thin and poorly developed child tended toward stockiness and obesity. This method of estimation of development is not appropriate for the Peruvian child. As in the coastal study, Wetzel developmental age showed such high correlation with weight that they appear to measure the same quality. Comparative studies on growth should be made in different areas where environmental conditions are contrasted, such as climate, nutrition, disease, economics, and sanitation. In this way information may be obtained on effects of particular nutrients. Of interest are the growth potentials of the Peruvian child and how these can be met as well as which factors in the environment affect these potentials.

It is probable that the slower growth of the Peruvian child is not completely dependent on poor health. It is also conceivable that the objectives should not be to push the Peruvian child above the North American 50th percentile in weight or height since rapid growth, increased weight, and large stature are not necessarily synonymous with health and longevity.

Summary

Two hundred seventy-five children attending public or private schools in the tropical city of Iquitos, Peru, participated in this study. Fifty-eight of the boys and 53 of the girls attended private schools and 48 boys and 116 girls attended a public school. The children were weighed, measured for height, and roentgenograms of the hand and wrist were obtained. These measurements were compared to 106 public school children from a coastal area of Peru.

Iquitos public school children, both boys and girls, were shorter and weighed less than the public school children from the coast or the private school children in Iquitos. When the heights and weights were plotted on the Stuart percentile chart, all but one of the Iquitos public school boys were below the 3rd percentile in height and two-thirds were below the 3rd percentile in weight. In the private school boys, 20 per cent were below the 3rd percentile in height and 40 per cent were above the 50th percentile. One private school boy was below the 3rd percentile in weight and about half were above the 50th percentile.

The girls presented a somewhat similar picture. Sixty per cent of the 116 girls were below the 3rd percentile and only one girl was above the 50th percentile in height. Fifty per cent were below the 3rd percentile in weight, and three girls were above the 50th percentile. Only one private school girl was below the 3rd percentile in height and 30 per cent were above the 50th percentile. Only one girl was below the 3rd percentile in weight and 40 per cent were above the 50th percentile.

Coastal children occupied an in-between position. They were significantly taller and heavier than the Iquitos public school children and significantly shorter and lighter than the private school children.

Private school boys were more advanced in skeletal development than were the public school boys from either area. Private school girls were more advanced than Iquitos public school girls, but not more advanced than coastal girls.

Heights and weights were relatively greater for boys under nine years of age than for those over nine. However, in skeletal development, there was no statistical difference between the two age groups in the private school, but the older children were more advanced in skeletal development for age in the public school. There were no statistical differences in height and weight of the two age groups in the girls, though there was a tendency for the younger children to be heavier and taller than the older girls. In skeletal development, the private school girls showed no change with age while the public school girls showed relative advancement with age.

Public school girls showed advanced skeletal age when compared to the public school boys, while relative heights and weights were not statistically different. There were no real differences in the measurements of private school boys and girls.

No individual dietary histories have been made on these children, but family studies of some of the public school children in both Iquitos and the coastal areas have indicated that the diets are far below standard for a number of nutrients.

Parasitosis was prevalent in all 116 Iquitos public school girls examined, and 82 per cent had hookworm infestation. Parasite counts were not done in the private school pupils. However, exposure to the agent was much less since the private school children wore shoes and had wooden or tile floors in their homes. Parasitosis is not much of a problem in the coastal area. It is conceivable that slower growth rates may not be correlated to poor health; nevertheless, it is of interest to study the relation of poor nutrition, parasitosis, and its resulting anemia on the growth rate of Peruvian children living in the tropical regions and what factors affect the growth potentials of the Peruvian child.

References

(1) STUART, H. C., AND STAFF: Studies from the Center for Research in Child Development, School of Public Health, Harvard University, 1. The center, the group under observation, sources of information, and studies in progress. Monographs Soc. for Research in Child Development Vol. 4, No. 1, (Serial No. 20). Washington, D.C.: Natl. Research Council, 1939.

(2) MEREDITH, H. V.: Stature and weight of children of the United States, with reference to the influence of racial, regional, socioeconomic and secular factors. Am. J. Dis. Child. 62: 909, 1941.

(3) MEREDITH, H. V., AND GOLDSTEIN, M. S.: Studies on the body size of North American children of Mexican ancestry. Child Development 23: 91, 1952.

(4) TRULSON, M. F., COLLAZOS, C., Ch., AND HEGSTED, D. M.: Growth and development of Peruvian children. 1. Carquin and San Nicholás. Pediatrics 17: 510, 1956.

(5) Unpublished data.

(6) CHATFIELD, C.: Food Consumption Tables for International Use. 2nd ed. FAO Nutritional Studies No. 3. Rome: Food and Agriculture Organization, 1950.

(7) FOOD AND NUTRITION BD.: Recommended Dietary Allowances. Natl. Acad. Sci.–Natl. Research Council Pub. 32, 1953.

(8) COLLAZOS, C., WHITE, H. S., REH, E., HUENEMANN, R. L., AND WHITE, P. L.: Dietary surveys in Peru. 1. San Nicolás. A cotton hacienda on the Pacific Coast. J. Am. Dietet. A. 29: 883, 1953.

(9) STUART, H. C.: Percentile charts of measurements, boys and girls. Boston: Children's Medical Center Anthropometric Chart, m.d.

(10) WETZEL, N. C.: Physical fitness in terms of physique, development and basal metabolism with a guide to individual progress from infancy to maturity: A new method for evaluation. J. A. M. A. 116: 1187, 1941.

(11) GREULICH, W. W., AND PYLE, S. I.: Radiographic Atlas of Skeletal Development of the Hand and Wrist. Stanford, Calif.: Stanford Univ. Press, 1950.

(12) STUART, H. C., AND MEREDITH, H. V.: Use of body measurements in the school health program. Am. J. Pub. Health 36: 1365, 1946.

(13) YULE, G. U., AND KENDALL, M. G.: An Introduction to the Theory of Statistics. 11th ed., rev. London: C. Griffin and Co., Ltd., 1937.

(14) GREULICH, W. W., CRISMON, C. S., AND TURNER, M. L.: The physical growth and development of children who survived the atomic bombing of Hiroshima or Nagasaki. J. Pediat. 43: 121, 1953.

(15) DEAN, R. F. A.: Standards for African children and the influence of nutrition. J. Trop. Med. 57: 283, 1954.

(16) SCRIMSHAW, N. S.: La leche en relación con la salud publica. Bol. Ofic. san. Panam. 37: 522, 1954.

(17) WHITE, P. L., QUIROS, A., GONZALES, L., MORALES, S., ATKINS, J., COLLAZOS, C., AND HEGSTED, D. M.: Iron treatment of anemia in a tropical area. Unpublished data.

(18) HUNTER, G. C.: Nutrition and host helminth relationships. Nutrition Abstr. & Rev. 23: 705. 1953.

Frozen Prepared Foods

Frozen prepared foods represent a rapidly-expanding facet of the food market. The list of foods now available in completely or partially prepared form literally extends from soup to dessert, and includes such exotic dishes as tacos and sukiyaki—in all, some 170 foods. Only ten items, however, account for 80 per cent of total output, with more than 10 million lb. each. They are: French fried potatoes, poultry potpies, fish sticks, dessert pies, beefsteak, meat potpies, mashed potatoes, meat patties, potato patties and cakes, and waffles and pancakes. French fries top the rest in production with 127 million lb.

Although at first, frozen prepared foods were largely a retail operation, institutional uses now account for some 20 per cent of production, with prepared meats and French fries taking the largest share of this new market.—*From Agricultural Marketing, August 1957.*

Nutritive Value of Irradiated Turkey[1]

DORIS HOWES CALLOWAY, Ph.D.,
EDMOND R. COLE, and
HARRY SPECTOR, Ph.D.[2]

Quartermaster Food and Container Institute for the Armed Forces, Chicago

THE COMMERCIAL availability of emission sources of gamma irradiation has promoted interest in the use of this technique in preserving foods. However, in the application of ionizing radiation, many highly reactive compounds are formed leading to disruption of chemical bonds and the production of abnormal by-products. Before this new method of "cold sterilization" can be recommended, it is essential that the potentially damaging effects on complex foods be investigated.

The data reported to date from government-sponsored research in this area support the conclusion that foods processed by irradiation are wholesome, although losses in some essential nutrients are sustained (1). Metta and Johnson (2) observed an 8 per cent reduction in the biologic value of milk protein given 3 megarep of gamma irradiation but no effect in similarly treated beef. Evidence was obtained by Read *et al.* (3) that growth was decreased in rats fed irradiated turkey (6 megarep) as compared with the raw, unprocessed material. An extensive investigation of the nutritive properties of turkey processed at several levels was therefore undertaken.

Procedure

Two experiments were conducted in which the biologic value of turkey—raw, processed, and prepared—was determined. In Experiment 1, irradiated turkey was compared with a conventionally heat-processed sample as well as with the "unprocessed" material. Higher radiation dosages were investigated in Experiment 2, and the ability of these samples to support rat growth was evaluated. The turkey samples were treated as follows:

EXPERIMENT 1

A homogenous mixture of raw turkey was made by stripping the muscle and skin from chilled carcasses of a single farm flock, grinding through ⅛-in. plate, and mixing under 28-in. vacuum for 10 min. Twenty-oz. samples of the ground material were hand-packed into 307 by 409 plain tin cans and the cans sealed under 20 in. of vacuum. The cans were then divided at random into three lots: two of these were frozen immediately at −20°F. and the remaining were processed in a retort for 114 min. at 240°F. (calculated F_0 value of 11.6). One lot of frozen turkey was irradiated in the frozen state. A preservation dose of 2 megareps, i. e., 2×10^6 rep[3] (ferrous dosimetry) was administered, spent fuel rods serving as the source of gamma irradiation. All samples, designated hereafter as unprocessed, heat processed, and irradiated were stored at −20°F. until tested.

Portions of the unprocessed and irradiated material were oven-roasted at 325°F. after formulation into loaves, until an internal temperature of 175°F. was reached. After removal from the oven, the internal temperature continued to rise to 185°F. Cooking times of 3-lb. loaves were 77 min. for the unprocessed turkey and 65 min. for the irradiated sample. The cooked material was reground to obtain a representative mixture.

EXPERIMENT 2

Fresh frozen turkey logs[4] were ground and mixed as before. Five-lb. lots were packed into 603 by 700 cans, an oxygen-scavenger packet added, and sealed. Three random lots were designated and placed in storage at 0°F. Two groups were then sterilized with

[1] This paper reports research undertaken at the Quartermaster Food and Container Institute for the Armed Forces, and had been assigned No. *721* in the series of papers approved for publication. The views or conclusions contained in this report are those of the authors. They are not to be construed as necessarily reflecting the views or indorsement of the Department of Defense. Received for publication January 23, 1957.

[2] The authors are indebted to the personnel of the Radiation Preservation and Animal Products Branches for preparation of the turkey and to the Chemistry Section for analyses.

[3] rep = roentgen equivalent physical, 93 ergs of radiation energy absorbed per gram.

[4] Muscle with skin packed into a casing. Packed by Pfaelzer Bros., Chicago.

3×10^6 or 6×10^6 (3 and 6 megareps) rep of gamma irradiation and the remainder held in the frozen state.

Half of each lot was then formed into 3-lb. loaves and roasted as in Experiment 1. The times required to reach an internal temperature of 175°F. were 58, 54, and 48 min. for the 0, 3, and 6 megarep samples, respectively.

BIOLOGIC DETERMINATIONS

For biologic value determination, diets were made up to contain on a moisture-free basis, 10 per cent protein derived from 14 per cent turkey solids (N × 6.25), 10 per cent total lipids, 2 per cent fiber, and 5 per cent ash. The diets were supplemented with a complete B-vitamin mixture, and fat-soluble vitamins were given by dropper twice weekly.[5] In Experiment 2, growth response to a diet containing 35 per cent turkey on a dry-solids basis was measured. For this purpose the protein yield of 35 gm. raw, unprocessed turkey solids was computed and all diets formulated to supply this constant percentage of protein (26.8 per cent). Representative diets are shown in Table 1.

Weanling, male, albino rats of the Sprague-Dawley strain were used throughout. The animals were standardized for one week prior to the tests by feeding a 4 per cent egg-protein diet. They were then divided at random into groups of ten animals each. For determination of biologic value, the animals received 6 gm. dry diet per day for fourteen days. Urine and feces were collected during the last seven days for nitrogen analysis (4). In each series, a group of animals maintained on the 4 per cent egg-protein diet served as the control for measurement of endogenous nitrogen excretion. Protein digestibility and biologic value were computed in the usual manner (5, 6).

In Experiment 2, eight-week growth was followed in groups fed both dietary levels of turkey. During the first six weeks, equalized feeding was employed; *ad libitum* food consumption was permitted the last two weeks. The animals were weighed twice weekly and food intake was recorded daily. No food rejection occurred when restricted amounts were offered.

[5] Each dose contributed 300 I.U. vitamin A, 5 I.U. vitamin D, 1.5 mg. alpha tocopherol, and 0.15 mg. 2-methyl-1,4-naphthoquinone.

TABLE 1 Representative diets (dry solids)

COMPONENT	10% TURKEY PROTEIN	35% TURKEY	4% EGG PROTEIN
	gm./ 100 gm.	gm./ 100 gm.	gm./ 100 gm.
Turkey, raw, unprocessed	46.2	123.8	—
Dried whole egg	—	—	8.6
Cottonseed oil	7.7	3.8	6.6
Fiber*	2.0	2.0	2.0
USP XIV salts	4.0	2.3	5.0
Sucrose	9.0	9.0	9.0
Cornstarch	63.2	46.9	67.8
B-vitamin mixture†	1.0	1.0	1.0

* Cellulose: Alphacel from Nutritional Biochemicals.

† A sucrose mixture supplying in mg. per 100 gm. diet: thiamine hydrochloride, 0.25; riboflavin, 0.50; pyridoxine hydrochloride, 0.25; niacin, 2.00; calcium panthothenate, 2.00; inositol, 10.00; para-aminobenzoic acid, 5.00; biotin, 0.01; folic acid, 0.10; vitamin B_{12}, 0.05; and choline chloride, 100.0.

Results and Discussion

There were no significant differences in biologic value attributable to radiation preservation or to cooking (Table 2). Protein digestibility was reduced only in the 6 megarep-cooked sample, and this difference was so small as to be of no practical significance. Biologic value of these samples was approximately 80 per cent and protein digestibility, 100 per cent. Thermal processing reduced the biologic value of turkey protein to 72 per cent but did not affect digestibility.

These data support the previously cited finding (2) that gamma irradiation does not affect the nutritive value of muscle protein and extend this observation to higher radiation dosage (6 megarep). Thermal processing has been shown by other workers (7, 8) to reduce the biologic value and protein efficiency of muscle meats. The most probable explanation of this decrement in biologic value is that amino acid cross-linkages are formed during heat treatment, modifying the physiologic availability of the protein. Support of this view is given by the findings of Sheffner *et al.* (9). They reported that there was no destruction of amino acids in turkey protein as a result of irradiation or of heat processing, but that

TABLE 2 Biologic value and true digestibility of turkey protein

METHOD OF PRESERVATION	EXPERIMENT 1		EXPERIMENT 2	
	Raw	Cooked	Raw	Cooked
Biologic Value				
	%	%	%	%
Unprocessed*	80.5 ± 1.4†	77.9 ± 0.9	82.5 ± 1.0	82.2 ± 1.0
Irradiated				
2×10^6 rep	79.8 ± 1.6	79.6 ± 1.1	—	—
3×10^6 rep	—	—	83.2 ± 1.3	81.9 ± 1.4
6×10^6 rep	—	—	82.0 ± 1.1	80.3 ± 1.1
Heat processed	—	71.7 ± 1.3‡	—	—
Protein Digestibility				
Unprocessed*	100 ± 0.2	100 ± 0.3	98.8 ± 0.1	99.8 ± 0.2
Irradiated				
2×10^6 rep	100 ± 0.2	100 ± 0.3	—	—
3×10^6 rep	—	—	100 ± 0.2	99.7 ± 0.2
6×10^6 rep	—	—	99.2 ± 0.2	98.4 ± 0.3¶
Heat processed	—	100 ± 0.2	—	—

* All samples were frozen in addition to the designated processing.

† Standard error.

‡ Differs significantly from unprocessed and irradiated samples, $p < 0.01$.

¶ Differs significantly from unprocessed and 3×10^6 irradiated samples, $p < 0.01$.

TABLE 3 Growth and food consumption during equalized and ad libitum feeding of various turkey diets

METHOD OF PRESERVATION	AVERAGE WEEKLY WEIGHT GAIN		AVERAGE DAILY FOOD INTAKE	
	Equalized feeding*	Ad libitum feeding†	Equalized feeding*	Ad libitum feeding†
10 per Cent Protein Derived from 14 Per Cent Turkey Solids				
	gm.	gm.	gm. dry solids	gm. dry solids
Raw turkey				
Unprocessed	21.3 ± 0.3‡	46.8 ± 4.1	9.33	19.76
Irradiated				
3×10^6 rep	21.7 ± 0.4	50.6 ± 3.2	9.31	19.58
6×10^6 rep	21.1 ± 0.3	48.0 ± 2.7	9.26	19.86
Cooked turkey				
Unprocessed	22.2 ± 0.2	44.2 ± 3.3	9.43	18.71
Irradiated				
3×10^6 rep	21.4 ± 0.3	45.7 ± 2.3	9.48	20.20
6×10^6 rep	22.1 ± 0.4	35.5 ± 3.0	9.36	17.71
26.8 Per Cent Protein Derived from 35 Per Cent Turkey Solids				
Raw turkey				
Unprocessed	31.1 ± 0.8	36.9 ± 2.4	9.55	15.41
Irradiated				
3×10^6 rep	30.0 ± 0.6	35.7 ± 2.4	9.68	15.68
6×10^6 rep	31.1 ± 0.8	38.7 ± 2.3	9.60	16.92
Cooked turkey				
Unprocessed	30.5 ± 0.7	38.4 ± 2.1	9.74	16.06
Irradiated				
3×10^6 rep	29.6 ± 0.5	36.6 ± 2.1	9.62	16.51
6×10^6 rep	30.5 ± 0.6	39.0 ± 1.4	9.57	17.07

* Six weeks.
† Two weeks following equalized feeding period.
‡ Standard error.

there was a decrease in the release of amino acids by peptic and pancreatic digestion *in vitro* in the heat-processed sample.

Growth response to the various diets is presented in Table 3. When feeding was equalized, identical growth was observed among all groups fed a given protein level. As anticipated, the more liberal allowance of protein permitted greater weight gains, 30 gm. per week as compared with 21 gm. at the lower level. Under *ad libitum* feeding conditions, the animals consumed 15 to 20 gm. dry diet daily and variations in intake level were reflected in differences in weight gain. Variation within groups was of the same order of magnitude as variation among groups, suggesting that appetite rather than nutritional quality was the determining factor. This, therefore, appears to be the most probable of the explanations offered by Read and co-workers (3) for the growth differences which they observed.

Summary

The biologic value and protein digestibility of turkey preserved by 2, 3, and 6 megarep of gamma irradiation or by heat was assessed, using the nitrogen balance technique in rats. Eight-week growth was measured in rats given unprocessed or irradiated turkey at 10 and 27 per cent dietary protein levels. In both determinations, the products were evaluated in the raw state and after cooking to an internal temperature of 175°F.

Neither irradiation nor cooking altered the biologic value of the turkey protein. Thermal processing reduced biologic value from 80 per cent to 72 per cent, a decrement of 10 per cent. Digestibility was 98.4 to 100 per cent in all samples. Equal growth response was obtained to equal feeding of raw, cooked, or irradiated samples at a given protein level; when *ad libitum* consumption was permitted, variations in food intake produced concomitant weight changes without relationship to type of diet.

References

(1) QM Food & Container Inst.: Annual Status Report, Radiation Preservation Project, No. 7-84-01-002, (Jan.), 1956.
(2) Metta, V. C., and Johnson, B. C.: The effect of radiation sterilization on the nutritive value of foods. 1. Biological value of milk and beef proteins. J. Nutrition 59: 479, 1956.
(3) Read, M. S., Kraybill, H. F., Worth, W. S., Isaac, G. J., and Witt, N. F.: Nutritional and toxicological studies on irradiated foods. 4. The growth rate of young male rats receiving gamma-irradiated turkey, bread, strawberries and corn. Med. Nutrition Lab. Rep. No. 174, 1956.
(4) Official Methods of Analysis. 7th ed. Washington: Assn. Off. Agric. Chemists, 1950.
(5) Mitchell, H. H.: A method of determining the biological value of protein. J. Biol. Chem. 58: 873, 1924.
(6) Mitchell, H. H.: Determination of the nutritive value of the proteins of food products. Indust. & Engin. Chem., Anal. Ed. 16: 696, 1944.
(7) Morgan, A. F., and Kern, G. E.: The effect of heat upon the biological value of meat protein. J. Nutrition 7: 367, 1934.
(8) Poling, C. E., Schultz, H. W., and Robinson, H. E.: The retention of the nutritive quality of beef and pork muscle proteins during dehydration, canning, roasting, and frying. J. Nutrition 27: 23, 1944.
(9) Sheffner, A. L., Adachi, R., and Spector, H.: The effect of radiation processing upon the *in vitro* digestibility and nutritional quality of proteins. Food Res., in press.

Areas for Executive Training

Executives should be well trained in four major areas, i.e., how to manage: (a) things, (b) situations, (c) people, and (d) themselves, so spoke Dr. Ralph T. Collins, Psychiatrist, Eastman Kodak Company before a personnel conference of the American Management Association.

If properly taught, executives will constantly reassess their strength, weaknesses, values, habits, and goals in order to stay afloat.—*From Food Engineering 28: 103 (June), 1956.*

II. Vitamin Losses after Irradiation and Cooking

Nutritive Value of Irradiated Turkey[1]

MIRIAM HIGGINS THOMAS and
DORIS HOWES CALLOWAY, Ph.D.[2]

Quartermaster Food and Container Institute for the Armed Forces, Chicago

FOOD PRESERVATION is accomplished primarily by heat, dehydration, freezing, and chemical preservatives. More recently, the sterilization of foods has been effected by the use of ionizing radiations.

Numerous investigations have been undertaken to determine the effect of ionizing radiation on the nutritive quality of food (1–6). This paper will report the thiamine, riboflavin, and niacin content of irradiated and non-irradiated turkey both before and after cooking.

Procedure

Experiments were conducted to compare the effects of 0, 2, 3 and 6 megarep radiation doses from gamma rays of spent fuel rods on the vitamin content of turkey. The samples used for this investigation have been described previously (7). A homogeneous mixture of raw turkey was hand packed into 307 by 409 tin cans and the cans sealed under 20 in. vacuum before freezing. Samples were irradiated in the frozen state and stored with non-irradiated samples at − 20°F. until tested. On opening the cans, the characteristic acrid or "burnt" odor developed during irradiation was observed, being more pronounced with greater radiation dosage. Irradiated samples were distinctly more pink than non-irradiated samples and the ground particles were less cohesive.

For cooking, the ground raw turkey was divided into 3-lb. lots and formed into loaves of 2-in. thickness. In Experiment 1, the turkey was taken directly from refrigeration for roasting; samples were allowed to reach room temperature prior to roasting in Experiment 2. A thermometer was inserted into the center of each loaf and the loaf allowed to cook in an open pan until the internal temperature of the loaf reached 175°F. A post-oven rise in temperature of 8° to 10°F. was observed in all loaves.

Weight losses on cooking were determined in all cases. The raw turkey was weighed before cooking started. At the end of the cooking period, the meat with its accumulated drippings was immediately weighed in the cooking pan to determine volatile losses. The turkey was then removed from the pan and the weight of the drippings determined. The sum of the volatile and dripping losses gave the total cooking losses. All turkey samples and the drippings from cooked samples of Experiment 2 were analyzed for moisture and fat as well as vitamin content.

Thiamine was determined by the thiochrome method; riboflavin by the fluorometric procedure and niacin by microbiologic assay (8). Moisture and fat content were determined by the Association of Official Agricultural Chemists (9) method and a modified A. O. A. C. method (10), respectively.

Results and Discussion

The cooking losses were the same for irradiated and non-irradiated turkey though greater in Experiment 1 than Experiment 2 (Table 1). The greater cooking losses may be attributed to the longer cooking time required for the internal temperature of samples started at 32°F. to reach 175°F. In Experiment 2, cooking losses were greater in irradiated turkey than in non-irradiated turkey. As would be expected, volatile losses increased with cooking time. Although volatile losses were less in irradiated samples, dripping losses were greater. Since the ground particles of irradiated turkey were less cohesive than those of non-irradiated turkey, the rate of heat penetration into the loaves was increased, resulting in the shorter cooking period and the greater dripping loss.

The effect of radiation on the thiamine, riboflavin, and niacin content of turkey is shown in Table 2. As the radiation dose increased from 2×10^6 to 6×10^6 rep, thiamine retention decreased from 36 to 10 per cent. Retention of riboflavin was considerably greater. In samples treated with 2×10^6 rep, 94 per

[1] This paper reports research undertaken at the Quartermaster Food and Container Institute for the Armed Forces, and has been assigned No. *729* in the series of papers approved for publication. The views or conclusions contained in this report are those of the authors. They are not to be construed as necessarily reflecting the views or indorsement of the Department of Defense. Received for publication March 14, 1957.

[2] With the technical assistance of Belle Rosler.

cent of the riboflavin was retained; increasing the dose to 6×10^6 rep resulted in 83 per cent retention. Niacin in turkey was unaffected by radiation doses up to 6×10^6 rep.

Although the thiamine losses obtained are of greater magnitude than reported for turkey by Proctor (11), a similar degree of radiosensitivity of thiamine in beef and pork has been reported by Tappel (12, 13). It should be pointed out that these data indicate results obtained using gamma irradiation from spent fuel rods, whereas Proctor's study reports results from high voltage cathode rays. The heat-labile properties of thiamine in food are affected not only by the amount and nature of the product, but the time and temperature of the "processing" operation. The literature reports (Table 2) that the retention of thiamine in meat products after heat-processing varies from 13 to 76 per cent. Therefore, it is likely that thiamine retention in separate studies might vary. On the other hand, the 94 per cent retention of riboflavin in turkey after treatment with 2×10^6 rep agrees favorably with the 96 per cent retention in turkey after treatment with 2.5×10^6 rep obtained by Proctor (11). That niacin is not affected by irradiation has been reported by other workers (11–14). However, during heat-processing, the retention of niacin has been found to vary from 71–100 per cent (Table 2).

In general, the use of irradiation for sterilization was found to be similar to heat-processing in its effects upon thiamine, riboflavin, and niacin in meat products (15–18).

The vitamin content of raw and cooked turkey is shown in Tables 3 and 4. In Experiment 1, pan drippings collected from single loaves were insufficient to obtain analyses for moisture and fat in addition to vitamin analyses. However, sufficient sample for all analyses was provided by the twelve individual loaves per treatment used in Experiment 2. Vitamin retention in Experiment 2 has been calculated on the basis of the total sample. All data have been corrected to a dry, fat-free basis.

Cooking losses of thiamine in irradiated and non-irradiated turkey were greater in Experiment 1 than the corresponding sample in Experiment 2. The greater losses encountered in Experiment 1 may be attributed to the longer cooking period (Table 1)

TABLE 1 Summary of cooking data

TREATMENT OF TURKEY	WEIGHT		TIME	COOKING LOSSES					
	Raw	Cooked		Volatile		Drippings		Total	
Experiment 1*									
	gm.	*gm.*	*min./lb.*	*gm.*	*%*	*gm.*	*%*	*gm.*	*%*
No irradiation	1362	980.6	26	324.4	24	57.0	4	381.4	28
Irradiated at 2×10^6 rep	1362	994.3	22	269.7	19	98.0	7	367.7	27
Experiment 2†									
No irradiation	1362	1289	19	34.9	2	38.1	3	73	5
Irradiated									
3×10^6 rep	1362	1233	18	26.2	2	102.8	8	129	9
6×10^6 rep	1362	1184	16	17.8	1	160.2	12	178	13

* Initial internal temperature of samples was approximately 32°F.

† Initial internal temperature of samples was approximate 78°F.; values represent average of twelve loaves.

TABLE 2 Effect of irradiation and heat-processing on vitamin content of various meat products

FOOD	TREATMENT	THIAMINE RETENTION	RIBOFLAVIN RETENTION	NIACIN RETENTION	SOURCE OF DATA
		%	%	%	
Turkey	irradiated				
	2×10^6 rep	36	94	100	this study
	3×10^6 rep	12	86	104	this study
	6×10^6 rep	10	83	98	this study
	2.5×10^6 rep	88	103	—	Proctor (11)
	heat-processed	88	96	—	Proctor (11)
Beef	irradiated				
	1×10^6 rep	76	90	100	Tappel (12, 13)
	3×10^6 rep	21	—	70	Tappel (12, 13)
	85 min. at 250°F.	13–24	171–278	—	Mayfield *et al.* (15)
	60 min. at 240°F.	35–37	213–280	—	Mayfield *et al.* (15)
Pork	irradiated				
	1×10^6 rep	84	—	93	Tappel (13)
	3×10^6 rep	12	52–79	78	Tappel (13)
Other meat products					
Luncheon meat	heat-processed	43–67	100	100	Rice *et al.* (16)
Luncheon meat	heat-processed	38–76	67–95	71–89	Greenwood *et al.* (17)
Luncheon meat	heat-processed	50	110	89	Brenner (18)
Chopped ham	heat-processed	68	90	94	Rice (16)
Beef and gravy	heat-processed	25	147	84	Brenner (18)
Pork sausage	heat-processed	40	133	88	Brenner (18)
Beef and pork loaf	heat-processed	40	106	89	Brenner (18)
Corned beef hash	heat-processed	50	140	92	Brenner (18)

TABLE 3 Effect of cooking on vitamin content and retention of irradiated and non-irradiated turkey (dry fat-free basis)—Experiment 1

IRRADIATION DOSAGE	THIAMINE			RIBOFLAVIN			NIACIN		
	Raw	Cooked	Retention	Raw	Cooked	Retention	Raw	Cooked	Retention
megarep	*mg./100 gm.*	*mg./100 gm.*	%	*mg./100 gm.*	*mg./100 gm.*	%	*mg./100 gm.*	*mg./100 gm.*	%
0	0.264	0.196	74	0.690	0.656	95	32.9	28.4	86
2	0.094	0.060	64	0.650	0.668	103	33.0	27.4	83

TABLE 4 Effect of cooking on vitamin content of irradiated and non-irradiated turkey (dry, fat-free basis)—Experiment 2

IRRADIATION DOSAGE	THIAMINE			RIBOFLAVIN			NIACIN		
	Raw	Cooked	Drippings	Raw	Cooked	Drippings	Raw	Cooked	Drippings
On Basis of Milligrams per 100 Gm.									
0	0.224	0.228	0.760	0.600	0.602	1.75	25.8	25.6	68.9
3	0.026	0.021	0.033	0.518	0.565	1.33	26.8	24.6	66.2
6	0.022	0.014	0.008	0.499	0.518	0.972	25.4	23.3	67.0
On Basis of Milligrams per Total Loaf									
0	3.05	2.94	0.290	8.17	7.76	0.667	351.4	330.0	26.2
3	0.354	0.259	0.034	7.06	6.97	1.37	365.0	303.3	68.0
6	0.300	0.166	0.013	6.80	6.13	1.56	345.9	275.9	107.3

required by these samples to reach an internal temperature of 175°F. Although only 74 per cent retention of thiamine was obtained in non-irradiated turkey cooked for the longer period, 96 per cent retention was found in samples cooked for the shorter period. When irradiation doses of increasing intensity were compared, it was noted that thiamine loss during cooking increased with the radiation dose.

The amount of thiamine recovered in the drippings was the same for turkey treated with 3×10^6 rep as for the non-irradiated turkey and slightly less at the higher irradiation dose (Table 5). Only in the sample of non-irradiated turkey was the entire diminution in the thiamine content during cooking attributable to the pan drippings.

No appreciable difference was found in the retention of riboflavin during cooking of non-irradiated and irradiated turkey, regardless of the radiation dose. Analyses of pan drippings indicated that the leaching of the vitamin from the meat into the pan drippings accounted for all the apparent loss of riboflavin.

In Experiment 1, there was no difference in the retention of niacin during cooking of irradiated and non-irradiated turkey. In Experiment 2, losses of niacin were greater during cooking of irradiated turkey, and no additional loss was obtained by increasing the irradiation dose. However, for both irradiated and non-irradiated samples, the decrease in niacin content could be accounted for by the quantity recovered in the drippings.

TABLE 5 Vitamin retention of cooked irradiated and non-irradiated turkey (dry, fat-free basis)

IRRADIATION DOSAGE	THIAMINE RETENTION			RIBOFLAVIN RETENTION			NIACIN RETENTION		
	Meat	Drippings	Total	Meat	Drippings	Total	Meat	Drippings	Total
	%	%	%	%	%	%	%	%	%
0	96	10	106	95	8	103	94	7	101
3	73	10	83	99	19	118	83	19	102
6	55	4	60	90	23	113	80	31	111

Summary

The thiamine, riboflavin, and niacin content of irradiated and non-irradiated turkey was determined both before and after cooking. Thiamine was severely affected by gamma irradiation doses of 2, 3, and 6×10^6 rep, the destruction increasing from 65 to 90 per cent with the increase in dose. Riboflavin was more resistant to irradiation than thiamine. A loss of 6, 14, and 17 per cent riboflavin occurred after turkey was treated with 2, 3, and 6 megarep, respectively. Niacin was not affected by irradiation.

After cooking, the retention of thiamine in irradiated turkey was less than in non-irradiated turkey. The amount of thiamine in cooked turkey decreased with the intensity of the irradiation dose. There was no difference in the amount of riboflavin retained in either irradiated or non-irradiated turkey. Retention of niacin was slightly less in irradiated turkey.

Analyses of pan drippings indicated that only thiamine was destroyed by heat, as all loss of riboflavin and niacin in turkey was recovered in the drippings.

In general, the use of irradiation for sterilization was found to be similar to heat processing in its effects upon thiamine, riboflavin, and niacin in meat products.

References

(1) Proctor, B. E., Goldblith, S. A., Bates, C. J., and Hammerle, O. A.: Biochemical prevention of flavor and chemical changes in foods and tissues sterilized by ionizing radiations. Food Technol. 6: 237, 1952.

(2) Kung, H. C., Gaden, E. L., and King, C. G.: Vitamins and enzymes in milk. Effect of gamma-radiation on activity. J. Agric. Food Chem. 1: 142, 1953.

(3) Cooke, A. R.: Effect of gamma irradiation on the ascorbic acid content of green plants. Science 117: 588, 1953.

(4) Vitamin changes in dairy products and plants on gamma irradiation. Nutrition Rev. 12: 138, 1954.

(5) Kraybill, H. F.: Nutritive effects on foods sterilized by ionizing radiations. Nutrition Rev. 13: 193, 1955.

(6) Goldblith, S. A.: Preservation of foods by ionizing radiations. J. Am. Dietet. A. 31: 243, 1955.

(7) Calloway, D. H., Cole, E. R., and Spector, H.: Nutritive value of irradiated turkey. 1. Growth-promoting quality and biologic value. J. Am. Diet A. 33: 1027, 1957.

(8) Assn. Vitamin Chemists: Methods of Vitamin As-

say. 2nd ed. N. Y.: Interscience Publishers, Inc., 1951.
(9) Official Methods of Analysis. 6th ed. Washington: Amer. Assn. Off. Agric. Chemists, 1945.
(10) CALLOWAY, D. H., AND KURTZ, G. W.: The absorbability of natural and modified fats. Food Res. 21: 621, 1956.
(11) PROCTOR, B. E., NICKERSON, J. T. R., AND GOLDBLITH, S. A.: Progress Report on U. S. Army Quartermaster Corps Contract No. DA-19-129-qm-521, Sept. 1 to Dec. 31, 1955.
(12) TAPPEL, A. L., KNAPP, F. W., AND BRACK, B.: Progress Report on U. S. Army Quartermaster Contract No. DA 19-129-qm-256, March 1 to April 30, 1955.
(13) TAPPEL, A. L., KNAPP, F. W., AND BRACK, B.: Progress Report on U. S. Army Quartermaster Contract No. DA 19-129-qm-256, May 1 to July 1, 1955.
(14) ALEXANDER, H. D., DAY, E. J., SAUBERLICH, H. E., AND SALMON, W. D.: Radiation effects on water soluble vitamins in raw beef. Fed. Proc. 15: 921, 1956.
(15) MAYFIELD, H. L., AND HEDRICK, M. T.: Thiamine and riboflavin retention in beef during roasting, canning, and corning. J. Am. Dietet. A. 25: 1024, 1949.
(16) RICE, E. E., AND ROBINSON, H. E.: Nutritive value of canned and dehydrated meat and meat products. Am. J. Pub. Health 34: 587, 1944.
(17) GREENWOOD, D. A., KRAYBILL, H. R., FEASTER, J. F., AND JACKSON, J. M.: Vitamin retention in processed meat. Effect of thermal processing. Indust. & Engin. Chem. 36: 922, 1944.
(18) BRENNER, S.: "B" vitamin retention in canned meat items during processing and storage. Intermin Report No. 2 on Vitamin B complex—stability. QM Food & Container Inst. for the Armed Forces, August, 1946.

BIOGRAPHICAL NOTES FROM THE HISTORY OF NUTRITION

James Lind—October 4, 1716–July 18, 1794

Scurvy was the scourge of sailors until 1795, when Sir Gilbert Blane, consultant to the British government on health of sailors, persuaded the government to pass an ordinance requiring the provision of lime juice for all men of the Navy. Scurvy then disappeared almost at once. The man responsible for providing Blane with evidence of the value of lime juice was James Lind, a great clinical investigator whose real worth has only recently been fully recognized. Not only did Lind demonstrate conclusively that juice of lemons would cure scurvy, he also showed the value of many other hygienic improvements for the health of sailors and has earned for himself the title of "father of nautical medicine." That was the only title he ever received, and no recognitions or honors were given him in England, although he wrote three classics in medicine in each of which he showed himself a pioneer thinker and an original investigator. Lind was a modest, unassuming man of kindly disposition who hated controversy and was happy in devoting himself to a life of clinical investigation, writing, and practicing medicine.

James Lind was born in Edinburgh, Scotland, the son of a merchant. When about fifteen years old, he was apprenticed to an Edinburgh physician (1731), but nothing is known of his medical training except that he passed the examination for surgeon's mate in the Royal Navy in 1739. In 1747 he was promoted to Surgeon of H.M.S. *Salisbury*, and it was on this ship that he carried out his experiments with lemon juice and gave world clear-cut the evidence of the curative value of fruit juice and also the first example of controlled clinical studies on human subjects.

Lind retired from the Navy in 1748 and went to Edinburgh where he obtained the medical degree and entered private practice. Ten years later he was appointed physician in charge at the Royal Naval Hospital at Haslar, Portsmouth. He held this position for twenty-five years when he was succeeded by his son, John. In the first two years in that hospital, one in five of all the patients had scurvy. While in Edinburgh, Lind read everything available on scurvy and started a paper on the topic, describing his own observations also. This paper grew into a volume and was published in 1753 as the now renowned classic, *A Treatise of the Scurvy*. In 1757 he published another classic in its field, *An Essay on the Most Effectual Means of Preserving the Health of Seamen in the Royal Navy*, and in 1768 his treatise on tropical medicine, *An Essay on Diseases Incidental to Europeans in Hot Climates*, appeared.

This brief summary cannot tell of Lind's many contributions to nutrition and to health: of his method of preserving orange juice, of his substitutes for citrus juice, of his method of preparation of fresh water from sea water, or of his hygienic measures. One can only recommend the references below to obtain the full story of his life and contributions.

Lind died July 18, 1794, in Gosport, Hampshire, and was buried there in St. Mary's Parish Church. Beside him is his wife, of whom nothing seems to be known except her name, Isobel Dickie, and her death, March 6, 1797.

REFERENCES: Lind Bicentenary Number. Proc. Nutrition Soc. (Great Britain) 12: No. 3, 1953; Lind, J.: Treatise on Scurvy. A Bicentenary Volume. Stewart, C. P., and Guthrie, D., eds. Edinburgh: Univ. Press, 1953; Roddis, L. H.: James Lind, Founder of Nautical Medicine. N. Y.: Henry Schuman, 1950.—*Contributed by E. Neige Todhunter, Ph.D., Dean, School of Home Economics, University of Alabama, Tuscaloosa.*

Nutritive Value of a Vegetable Protein Mixture[1]

R. F. PRIER and P. H. DERSE

Research Laboratories, Wisconsin Alumni Research Foundation, Madison

WITH THE importance of the amino acid balance in the protein becoming more and more apparent, a variety of techniques to measure the nutritional value of a specific protein have been developed. Application of these techniques to various proteins has demonstrated that good proteins contain amino acids in such numbers and quantities as best fulfill the requirements of the organism ingesting them, and that poor proteins are either deficient or oversupplied in one or more of the essential amino acids.

Nitrogen balance studies, growth response in rats, investigations involving bacteria, and chemical studies have all indicated in the past that proteins of animal origin have a superior biologic value when compared with proteins of plant origin. A critical comparison of two proteins of the same class is best made by actual feeding studies, as the chemical composition with regard to the essential amino acids is not always sufficiently different.

This fact has established the concept of balance within a protein. This concept of balance is a convenient one although lacking in precision and gains support from the work of Sure (1) and others who have demonstrated the feasibility of improving protein quality by suitable combinations of various incomplete proteins. The protein contained in soy bean, in particular, has been found to be very capable of producing a desirable effect in mixtures of two or more of the grain proteins. Although still not excellent, the resulting protein combinations are improved biologically. The improvement is not without cost, however, since the mixture suffers a decrease in palatability attributed to the soy material.

The value of individual grains in nutrition has been extensively studied (2–4). Supplementation with lysine to improve the protein of wheat has been reported (5, 6).

The present study concerns the evolution of a vegetable protein mixture[2] in which the biologic value by laboratory animal test has been found to be comparable to that of animal protein. The mixture is composed of wheat germ, a specially prepared wheat fraction (the aleurone layer of the wheat kernel), and specially processed defatted soy bean flour. This combination is worthy of note because of its palatability, the objectionable soy flavor being completely masked.

Methods and Results

As the primary objective of the study was to effect the testing of the vegetable protein mixture for protein quality, various procedures in experimentation were employed. The first was that of Friedman and Kline (7) with modification. Weanling rats (male) of the Sprague-Dawley strain were employed throughout all the studies, and protein evaluation trials were of four weeks' duration. The animals were housed in individual screen bottom cages. A basal diet (Table 1, Ration 1) consisting of Cerelose, cottonseed oil, a salt-vitamin mixture, and protein at a level of 9.09 per cent was used. The diet was equalized in fat and water content and was fed at the rate of 1 gm. protein per rat per day. The results are reported in Table 2, under Experiment 1.

In Experiment 2 the ration was fed on an *ad libitum* basis employing a level of 11.5 per cent protein. The vitamin content was increased as shown in Table 1, Ration 2. The conditions employed and results are given in Table 2. A measure of the benefit of the vegetable material when added to bread was obtained by feeding commercial white bread containing 6 per cent milk solids and a 5 per cent milk bread containing 20 per cent of the vegetable-protein mixture at the expense of the flour. The bread was prepared for animal feeding by air-drying at 76°F. The material was ground and proximate analyses performed prior to use.

The diets were equalized with respect to fiber, ash, fat, and moisture. As outlined in Table 2, Experiment 3 was set up with and without vitamin B_{12}. In

[1] Received for publication November 30, 1956.

[2] Vegetable mixture trade marked "V[10] Protein."

addition to the vegetable-protein mixture and the two breads fed in previous tests, two protein mixtures comprised of mixed animal protein and mixed animal protein plus flour were fed with and without B_{12}. These proteins are described in Table 3. The results of the test are given in Table 2.

In the last direct feeding trials described in this paper, *ad libitum* feeding was employed with 11.5 and 16 per cent protein levels. The vitamin content was kept constant. These levels with vitamin B_{12} are described in Ration 3, Table 1. The experimental conditions and results of Experiment 4 are given in Table 2.

Another technique to measure the quality of the vegetable-protein mixture was initiated employing the depletion-repletion procedure of Frost and Sandy (8). Casein, vegetable mixture, regular bread, and bread containing 20 per cent vegetable mixture were compared. Adult male rats, five per group, of the Sprague-Dawley strain weighing approximately 200 gm. were used. The animals were brought into negative nitrogen balance and weight loss by feeding a nitrogen-free but otherwise complete semi-synthetic diet for a twelve-day period. Through the five-day repletion cycle, the animals were fed the test material at a level to furnish 0.2 gm. nitrogen per day plus the basal nitrogen-free diet *ad libitum*. Following a two-day normalizing period in which the animals were fed a commercial laboratory chow diet, a seven-day depletion cycle was begun during which the animals were provided, as before, with only the nitrogen-free basal diet. Three cycles of depletion and repletion were carried out. The average repletion gain in grams is given in Table 4.

Concurrent with the animal work, analyses were conducted on the vegetable mixture. The results are shown in Table 5. These include mineral, vitamin, amino acid, and proximate analyses.

In Experiment 1, the animals receiving 1 gm. protein per day from either the casein or vegetable mixture grew at a slow but equal rate. The grams gained per gram of protein consumed were equal. Increasing the protein level to 11.5 per cent, increasing the vitamin level, and allowing the animals to eat *ad libitum* (Experiment 2, Ration 2) increased the weekly gain. The protein efficiency of the casein was slightly higher than that of the vegetable mixture. The weight gain and protein efficiency of the protein in the bread was significantly improved by the addition of the vegetable mixture.

The addition of para-aminobenzoic acid, inositol, and menadione (Experiments 2 and 3) to the diet did not enhance the growth of the rat. The addition of vitamin B_{12} to the ration increased the weight gain of the rats although it did not significantly change the relative protein efficiencies.

The animals receiving the animal-protein mixture as the protein source grew at a rate similar to those receiving the casein and the vegetable-protein mixture. However, the protein efficiency of the animal-protein mixture was reduced when flour was included. With the addition of vitamin B_{12} to the

TABLE 1 Vitamin supplementation per kilogram ration

INGREDIENTS	RATION 1	RATION 2	RATION 3
Cod-liver oil	20.0 gm.	20.0 gm.	20.0 gm.
Wheat germ oil	10.0 gm.	10.0 gm.	10.0 gm.
Thiamine hydrochloride	0.002 gm.	0.01 gm.	0.01 gm.
Pyridoxine hydrochloride	0.0025 gm.	0.01 gm.	0.01 gm.
Riboflavin	0.003 gm.	0.01 gm.	0.01 gm.
Niacin	0.015 gm.	0.01 gm.	0.25 gm.
Calcium pantothenate	0.02 gm.	0.06 gm.	0.06 gm.
Choline chloride	0.1 gm.	1.20 gm.	3.0 gm.
Cerelose	51.86 gm.	2.20 gm.	10.15 gm.
Para-aminobenzoic acid	—	0.30 gm.	1.2 gm.
Inositol	—	2.20 gm.	0.30 gm.
Vitamin B_{12}	—	—	0.01 mg.
Menadione	—	—	0.2

TABLE 2 Weight gains* and protein efficiency†

FOODS TESTED	EXPERIMENT 1 (9.09% protein)		EXPERIMENT 2 (11.5% protein)		EXPERIMENT 3 (11.5% protein)				EXPERIMENT 4			
					Without B_{12}		With B_{12}		11.5% protein		16% protein	
	Weight gain	Efficiency	Weight gain	Efficiency	Weight gain	Efficiency	Weight gain	Efficiency	Weight gain	Efficiency	Weight gain	Efficiency
Casein	44	1.94	70	1.63	72.4	2.30	88.2	2.46	98.2	2.54	138.5	2.39
Vegetable mixture	46	1.99	61	1.46	86.4	1.92	119.6	2.58	119.6	2.56	137.8	2.19
White bread	—	—	12.5	0.36	14.6	0.69	17.8	0.94	—	—	—	—
Vegetable mix bread	—	—	34	0.91	30.2	1.40	37.6	1.66	—	—	—	—
100% animal protein mixture	—	—	—	—	79.4	2.22	87.2	2.26	91.2	126.5	126.5	2.25
60% animal protein mixture	—	—	—	—	73.4	1.71	64.6	1.76	64.6	145.4	145.4	2.10

* Grams per 4 weeks.

† Grams gain per gram protein consumed.

ration, the growth rate of the rats was increased and the superiority of the casein and the vegetable-mix protein was noted via an increase in protein efficiency. The protein efficiency of the bread protein was almost doubled when 20 per cent of the vegetable mixture was added irrespective of the presence of vitamin B_{12}.

In Experiment 4, the relative efficiencies of casein, vegetable mixture, 100 per cent animal-protein mix, and 60 per cent animal-protein mixture remained essentially the same, whether the protein level was 11.5 or 16 per cent.

The depletion-repletion experimental work outlined in Table 4 follows the nutritional pattern as obtained with the feeding tests. Repletion was more complete with the mixture of cereal proteins than with the casein protein. The repletion weight gain of the animals receiving bread containing the vegetable mixture was greater than that of the animals receiving bread alone.

The wheat fraction making up the greater percentage of the vegetable mixture employed in this paper is one in which the fibrous outer layer of bran is discarded along with the greater part of the starchy portion of the wheat kernel. The inner bran and aleurone layers and the immediately adjacent portions are retained and have been found to contain significant portions of the vitamin, protein, and mineral content of the whole wheat. Wheat germ and depleted soy grits in the mixture enhance the amino acid pattern as illustrated by Table 5.

If the amino acid values in Table 5 are compared with the values recommended for the rat by Rose (9), the biologic superiority of the vegetable mix reported is readily understandable. The values reported for cystine and tyrosine supplement the methionine and phenylalanine values respectively. In like manner, the human requirements of Rose are satisfactorily met with the vegetable mixture. Recent work of Elvehjem *et al.* (10) considers the possible toxicity of feeding proteins high in certain of the amino acids as demonstrated by decreased growth and fat deposition in the liver. The livers of the rats receiving the vegetable mixture in the present studies were found to be normal as regards fat content, and growth was satisfactory.

TABLE 3 Composition of the animal-protein mixtures* fed in Experiments 3 and 4

INGREDIENTS	PER CENT
Animal Protein Mixture	
Fresh ground beef	20
Fresh ground pork	20
"American" cheese	20
Non-fat dry milk	20
Fresh whole eggs	20
Animal-Vegetable Protein Mixture	
Fresh ground beef	15
Fresh ground pork	7.5
Bacon	7.5
"American" cheese	10
Non-fat dry milk	10
Fresh whole eggs	10
Enriched white flour	40

* Materials were ground together, air dried at room temperature, reground, and analyzed.

TABLE 4 Depletion-repletion evaluation

SAMPLE	AVERAGE REPLETION GAIN*	RATIO (casein = 1.00)
	gm.	
Casein	14.3	1.00
Vegetable mixture	18.1	1.27
Regular bread	5.3	0.37
Vegetable mixture bread	10.9	0.76

* Average of three cycles.

TABLE 5 Analytical data on vegetable mixture

NUTRIENT	MEASURE
Amino Acids	
	mg./gm.
Arginine	19.0
Histidine	5.9
Isoleucine	12.0
Leucine	17.4
Lysine	15.0
Methionine	3.6
Cystine	6.8
Phenylalanine	13.2
Tyrosine	8.6
Threonine	7.2
Tryptophan	2.6
Valine	13.5
Proximate Analysis	
	%
Moisture	8.75
Ash	3.02
Ether extract	3.03
Protein	27.19
Crude fiber	1.97
Carbohydrate	56.04
Vitamins	
	mg./100gm.
Niacin	4.24
Thiamine	0.91
Riboflavin	0.37
Vitamin B_{12}	0.00018
Pyridoxine	0.50
Panthothenic acid	1.48
Folic acid	0.19
Biotin	0.0184
Inositol	220
Minerals	
	mg./100gm.
Calcium	79
Iron	5.4
Phosphorus	542
Sodium	2.4

The supposition remains that we have here a high-protein mixture of purely vegetable origin possessing good amino acid balance. The use of soy protein to enhance the biologic value of the material is noteworthy in that the food consumption of the animals receiving the vegetable mixture was uniformly high.

The possible uses of a vegetable mixture of high quality protein content and good taste are manifold. The test of the efficiency of the vegetable mixture in the supplementation of bread presented here is but a step in this direction. When the ready, world-wide availability of the vegetable components, wheat and soy, is considered, the uses in the fields of reclamation nutrition become obvious. An additional consideration worthy of note in planning medical and surgical diets is the possibility of formulating a high quality protein diet which is, at the same time, relatively low in fat content.

Summary

The protein efficiency of a vegetable protein mixture, as determined through the use of several biologic testing procedures with rats is reported. Data on the analysis of the vegetable protein, including amino acid, vitamin, and mineral content, are also presented.

References

(1) SURE, B.: Nutritional improvement of cereal grains with small amounts of foods of high protein content. Ark. Agric. Exper. Sta. Bull. 493, 1950.

(2) MITCHELL, H. H., AND SMUTS, D. B.: The amino acid deficiencies of beef, wheat, corn, oats and soy beans for growth in the white rat. J. Biol. Chem. 95: 263, 1932.

(3) PECORA, L. J., AND HUNDLEY, J. M.: Nutritional improvement of white polished rice by the addition of lysine and threonine. J. Nutrition 44: 101, 1951.

(4) SURE, B.: Influence of lysine, valine and threonine additions on the efficiency of the proteins of whole wheat. Arch. Biochem. 39: 463, 1952.

(5) ROSENBERG, H. R., ROHDENBURG, E. L., AND BALDINI, J. T.: The fortification of bread with lysine. 3. Supplementation with essential amino acids. Arch. Biochem. 49: 263, 1954.

(6) HUTCHINSON, J. B., MORAN, T., AND PACE, J.: Effect on the growth-rate of weanling rats of supplementing the protein of white bread with *l*-lysine. Nature 178: 46, 1956.

(7) FRIEDMAN, L., AND KLINE, O. L.: The relation of the amino acid-sugar reaction to the nutritive value of protein hydrolysates. J. Nutrition 40: 295, 1950.

(8) FROST, D. V., AND SANDY, H. R.: Assay of dry proteins by rat repletion method. Nutritive value and amino acid composition of six reference proteins. J. Nutrition 39: 427, 1949.

(9) ROSE, W. C.: The nutritive significance of the amino acids. Physiol. Rev. 18: 109, 1938.

(10) ELVEHJEM, C. A.: Amino acid balance in nutrition. J. Am. Dietet. An. 32: 305, 1956.

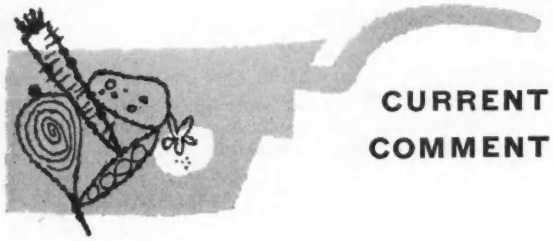
New Crops Recommended by Agriculture Commission

Among the new crops recommended as having potentialities for production in the U. S. by the government's Commission on Increased Industrial Use of Agricultural Products are: sesame, dioscorea, and guar.

Sesame, the Commission reports, could be used for seed, oil, and meal for many food, feed, and industrial uses and could be established as a successful crop in the South comparable to soybeans in the North. It is adapted to growing in the cotton belt, and with the solving of some remaining production problems, could be expected to produce 2000 lb. seed and more oil per acre than any other annual edible-oil seed crop. The seed is about 50 per cent oil by weight, and the oil is especially valuable for food use (salads and cooking) as well as in the manufacture of paints, soaps, cosmetics, perfumes, pharmaceutical products, and pyrethrin insecticides.

Dioscorea shows potentialities in the manufacture of drugs and chemicals, including cortisone and hormones. The plant, also known as the Mexican yam, is the chief plant source of the chemical from which cortisone can be derived more economically and in larger quantities than from animal glands. The entire U. S. supply at present comes from wild plants and is imported. An assured domestic supply would meet a large demand from the drug industry. The plant is reported to be adaptable for growing in the South, particularly, Georgia, Florida, and the Gulf Coast states. The main problems for research are the introduction of sufficient planting material with a high content of the cortisone precursor and maintaining this high content in the cultivated crop.

Guar is a third plant which might be produced commercially in larger quantities, according to the Commission. Flour from guar—an annual, drought-resistant legume—is used in making cheese spread, salad dressings, and ice cream mixes. It is also useful in the paper and textile industries. The beans are a good protein supplement for cattle feeding, and the plant makes an excellent dry-land forage or green manure for soil improvement. In 1955, some 107,000 acres were grown in warm areas from northern Oklahoma southwestward through Texas to Arizona. Irrigation would extend the area of production. More research leading to genetic and cultural improvement of the plan is needed for its expanded production and subsequent increased use in industry.



CURRENT COMMENT

Typhoon Emergency Feeding on Okinawa

1ST. LT. PATRICIA L. ACCOUNTIUS, AMSC
and
1ST LT. MARY L. FISK, AMSC

Ryukyus Army Hospital
Okinawa

A dictionary definition of a typhoon is: "A storm 50 to 900 mi. in diameter, moving 20 to 30 mi. an hour with violent winds rotating in a counter clockwise direction around a calm center and with much rain. A tropical cyclone."

During the summer of 1956, Okinawa, the largest island of the Ryukyus chain, located in the Pacific typhoon belt about midway between Japan and Taiwan, experienced four typhoons. The most severe was "Typhoon Emma," which had recorded winds of 146 mi. per hour prior to the time the wind measuring instruments blew away.

Typhoon Conditions

Typhoon alert conditions were compiled by the weather station and all residents of the island were kept informed of the progress of each typhoon. Alert conditions are:

(a) Typhoon Condition III (typhoon alert condition)—when winds of 50 knots or greater are expected on Okinawa within 48 hr.

(b) Typhoon Condition II (typhoon security condition)—may be declared when winds of 50 knots or greater are expected within 24 hr.

(c) Typhoon Condition I (typhoon emergency condition)—may be declared when winds of 50 knots or greater are expected within 12 hr.

(d) All Clear—declared when the typhoon has passed.

Ryukyus Army Hospital, the medical facility for all service and U.S. civilian personnel and their families on Okinawa, is housed in quonset huts pending completion of a permanent-type structure. The age of the quonsets and the intensity of the winds combined to render them unsafe for occupancy during the typhoon conditions. Patients and duty personnel had to be evacuated to a nearby dispensary and field house.

The Food Service Division of Ryukyus Army Hospital was responsible for the preparation and service of thirty-three meals during the four typhoons. Approximately 1600 meals per day for patients and duty personnel were served. In addition, soup, sandwiches, and coffee were served around the clock.

This Division is normally staffed with two dietitians, one food supply officer, fourteen enlisted men, and sixty-six "indigenous employees" (Okinawans). When Typhoon Condition I was declared, all married personnel were released to quarters and the indigenous personnel were relieved of duty until the all-clear signal was announced. Consequently, during the emergency typhoon condition, the Food Service Division was staffed by two dietitians and nine enlisted men.

There were no kitchens or facilities available in either the field house or the dispensary. A storage room in the field house was utilized for a kitchen, and another kitchen was set up in the second floor lobby of the dispensary. A 500-gal. water trailer was provided in anticipation of water shortage or pollution, as well as an emergency generator for power failure. Thus, the primary consideration in the preliminary planning was the type of food and equipment needed to serve good, nutritious meals under the existing circumstances.

Two 2½ ton trucks were utilized for the transportation of food and equipment between the Food Service Division, the field house, and the dispensary.

Equipment

Field ranges were used for all cooking done at the field house and at the dispensary. The M 1937 field range provides a complete field kitchen outfit and is packed in two basic packs, the A pack and B pack. It consists of a cabinet with the essential cooking and serving utensils and a gasoline-burning fire unit. One A pack contains everything essential for the

Okinawa *Morning Star* photo

Patients arriving at the field house after evacuating the hospital

U.S. Army photo

Serving line erected in dispensary dental clinic

operation of from one to four field ranges, for example; a fire extinguisher, air pump, can opener, sharpening stone, meat cleaver, and tools. The number of B packs needed is proportionate to the number of individuals served. The component parts of a B pack are:

1 cabinet
1 cover, roasting pan, 2 by 17⅝ by 21⅛ in.
2 covers, cook pot, or insert
1 cradle, cook pot
1 1-qt. dipper
1 fork, cook, flesh, 15 in.
1 fork, cook, flesh, 21 in.
1 insert, pot, cook, 10 gal.
1 knife, butcher, 10-in. blade
2 knives, paring
1 ladle, length over-all, 21 in.
1 plate, splash
1 pot, cook, heavy, 15 gal.
1 protector, arm long
1 protector, arm short
1 skimmer, length over-all, 15 in.
1 spoon, basting, length over-all, 21 in.
1 turner, cake, length over-all, 15 in.
1 spoon, basting, length over-all, 21 in.
1 turner, cake, length over-all, 15 in.
1 pan, bake and roasting
1 pan, cake, 1⅜ by 16 by 19½ in.
1 unit, fire simplified

Food Supplies

Due to the lack of refrigeration at the field house, it was possible to take only non-perishable items of subsistence. In the event of a long period of isolation, a three-day level of individual Combat Rations was included.

The individual Combat Rations are composed of five menus. Each ration, which is the amount of food necessary to feed one man three meals for one day, contains the following items:

3 small cans meat
1 can crackers, cocoa, and jam
1 can crackers, candy, and jam
1 can fruit
1 can cake
1 package cigarettes
1 accessory packet consisting of:
humidity-resistant matches, soluble coffee, can opener, chewing gum, toilet paper, plastic spoon, water purification tablets, sugar, salt, soup and gravy base, soluble milk, soluble tea, and chocolate.

Nutritionally speaking, the individual Combat Rations contain 3930 calories, 140 gm. protein, 110 mg. calcium, 8700 I. U. vitamin A, 1.48 mg. thiamine, 2.66 mg. riboflavin, 33.9 mg. niacin, and 87.0 mg. ascorbic acid.

The following non-perishable items were taken to supplement the Combat Ration and provide for modified diets.

Bouillon cubes
Canned fruit
Canned meat
Canned cheese
Cereals, dry and cooked
Coffee
Corn sirup
Crackers
Dehydrated chicken noodle soup
Dehydrated eggs
Dehydrated potatoes
Evaporated milk
Fruit juices
Pepper
Powdered milk
Salt
Shortening
Strained fruits
Strained meat
Strained vegetables
Sugar
Tea bags

In order to incorporate perishable supplies, such as fresh meat, fruits, and vegetables, into the menu after evacuating the hospital, every effort was made to prepare the meals in the hospital kitchen and to send the prepared foods in insulated containers to the field house and dispensary until such time as vehicles were no longer permitted on the roads, due to the winds. During the 12- to 24-hr. periods of confinement caused by winds of 100 to 150+ mi. per hour, individual Combat Rations were heated on the field ranges and served.

Temporary serving lines were constructed from litters and cases. Patients and duty personnel were served in the following order: patients on modified diets, bed patients, ambulatory patients, duty personnel. As long as transportation permitted, the food was served on metal mess compartment trays and the dishwashing was done at the hospital. When this was impossible, paper goods were used and the silverware was washed and boiled at the field house. Additional personnel were detailed to assist on the serving line and with the dishwashing.

Due to the lack of facilities and personnel available for the preparation of modified diets, the chiefs of the medical and surgical services were consulted concerning therapeutic diets to be served. With their cooperation, it was possible to eliminate all modified diets with the exception of liquid, dental liquid, diabetic, and convalescent ulcer diets.

Experience Gained

In making plans for the next typhoon season, the major changes will be made in the elimination of the use of metal compartment mess trays and in the dishwashing facilities. Individual mess gear, consisting of compartment meat can, canteen cup,

knife, and fork and spoon will be issued to all duty personnel. The patients will be served entirely on paper goods. For dishwashing, three 32-gal. galvanized cans will be placed on cradles over the fire units from the field ranges. The first one will be filled with hot soapy water and the second and third with boiling rinse water. Each individual will scrape his own mess kit, wash in soapy water, rinse in two changes of boiling water, and air dry. The patients' silverware will be washed in the same manner.

It has become evident to us that it would be difficult to establish a comprehensive list of food and equipment for emergency disaster feeding that would be appropriate for all types of emergencies, such as typhoons, tidal waves, mass casualties, and other types of disasters. The type of set up and the menus used would depend entirely on: the existing situation; availability of water, electricity, refrigeration; the amount of previous planning; and the types of food and equipment available.

A "Shared" Dietitian in Fiji

MARGOT C. BARNARD

Supervising Dietitian
Colony of Fiji
Suva, Fiji

It was with anticipation that I took up the duties of supervising dietitian of the Fiji Islands in July 1955.[1] It was a newly created position under the British colonial government and would involve considerable traveling between the various islands which make up the archipelago of some 250 islands.

Fiji, as part of the fabled and romantic "South Seas," is tropical, being straddled in Melanesia athwart the 180th meridian lying between 16 and 19° south of the Equator. It has a population of more than 300,000 inhabitants, made up of many races. The seat of the British Crown Colony's government is situated on the largest island of the group, Viti Levu, in the city of Suva.

Although each of the islands has a dispensary, only the largest can boast hospitals: Viti Levu, which has several hospitals ranging in size from 350 beds down to 24 beds; Vanua Levu, with three hospitals—110, 23, and 12 beds respectively; and Kandaou (pronounced Kandavu) which has one hospital of 20 beds. Other islands which have hospitals are Taveuni, Rambi, and Ovalu.

Food Habits

In Fiji, the four major races of the population constitute the groups whose food habits must be studied: Europeans, Fijians, Indians, and Chinese.

The European pattern of eating needs little discussion, since it is familiar to most readers of this JOURNAL. The Chinese, too, present little in the way of problems. They are easily pleased and like rice, poultry, fish, and pork.

The Indians eat mutton and goat meat and *dhal* (similar to split peas) made into curries with vegetables, including *baigans*, or egg plant. This is served with large helpings of rice. The Indians also eat *roti*, made from "Sharpes," which is derived from wheat germ and therefore is high in the B-complex vitamins. It is eaten largely in place of bread and biscuits. "Sharpes" is like a fine white flour and is mixed to a dough-like paste. Thick pieces about the size of the top of a cup are taken in the palm of the hand and flattened to the size and thickness of a pancake. In cooking, the *roti* is greased continually with *ghee* (clarified butter) and flipped from side to side on an iron over a hot fire until both sides are lightly browned. Incidentally, we have tried using vegetable oils as substitutes for the *ghee*, but they seem to toughen the *roti*.

Some Indians do not eat meat at all—only *dhal*, milk, vegetables, roti, and fruit.

The diet of the native Fijians is perhaps the strangest to a person new to the islands. On the whole it is very high in carbohydrate, due to the large consumption of root crops. Such vegetables, however, are rich in vitamin A, thiamine, and riboflavin and have small amounts of vegetable protein in addition to the carbohydrate they provide. Thus, because of the large amounts eaten, intake of these nutrients becomes appreciable. Some even provide some ascorbic acid when the green leaves can be eaten. A description of these may be helpful.

DALO (*Colacasia Antiquorum*) or taro, as it is called in Samoa and the Hawaiian Islands, is similar to a large lily root and has smooth green, lily-like leaves. These can be cooked and eaten with coconut cream, the dish being called *rourou*. The root varies in size from small to large, with a large root weighing as much as 10 lb. or more. DALO-NI-TANA is a bush dalo and has a very long thin root, but the same kind of leaves. VIA is a wild dalo of a very large variety, with leaves sometimes large enough to pluck for use as an umbrella when it rains.

YAMS (*Dioscorea* species) are twice as rich in vegetable protein as the other root vegetables. In Fiji there are both a large and small variety. The flesh is similar to that of a potato. KUMALA (*Impomoea batatas*) is larger than but similar to a "kumara" or sweet potato grown in New Zealand.

EGGPLANT (*Solanum Melongena*) is a vine-type plant which produces a long fruit, purplish on the

[1] Prior to this position, I had been the sole dietitian-in-charge at the 220-bed Gisborne Public Hospital in New Zealand.

99% of your patients will say...

"Meritene® tastes good!"

WHOLE PROTEIN SUPPLEMENT

(as good as ice cream!)

Why so much emphasis on taste? Because, simply stated, there is no value in any nutritional product—regardless how good the analysis looks—if it is not acceptable to the patient.

MERITENE Whole Protein Supplement *is* acceptable to patients because of its pleasant ice-cream-like taste. (Try it yourself!) And it's easy to prescribe, easy to administer, and economical for patients who use it at home.

MERITENE mixes with milk in seconds (and *stays* mixed) for ideal high protein supplementation. One 8-ounce MERITENE Milk Shake provides over one quarter the N.R.C. Daily Dietary Allowances for protein and all essential vitamins and minerals.

MERITENE has been widely used by doctors and dietitians ever since its introduction in 1940. Available at all drugstores in 1 and 5 lb. cans, chocolate or plain flavor. (Institutional size 25 lb. cans as low as 76¢ per pound on direct order from Minneapolis.)

MORE NUTRITIVE THAN EGGNOG

	8 oz. MERITENE MILK SHAKE	8 oz. EGGNOG*
Protein	17.9 gm.	14.6 gm.
Fat	9.5 gm.	15.0 gm.
Carbohydrate	28.6 gm.	24.7 gm.
Iron	4.46 mg.	1.5 mg.
Calcium	.58 gm.	.31 gm.
Phosphorus	.46 gm.	.33 gm.
Vitamin A	2380 I.U.	940 I.U.
Thiamine	.27 mg.	.14 mg.
Riboflavin	1.64 mg.	.56 mg.
Ascorbic Acid	25.7 mg.	3.0 mg.
Vitamin D	161 I.U.	31 I.U.
Cholesterol	38.4 mg.	209 mg.
Calories	270	291 mg.

*Eggnog nutritive value from Bowes & Church, 7th Ed. 1951

ALSO AVAILABLE NEW INSTANT MERITENE

FREE 1-LB. CAN—CLIP AND MAIL TODAY

MD-107

MERITENE, c/o THE DIETENE COMPANY
3017 Fourth Ave. So., Minneapolis 8, Minnesota
Please send me a FREE one-pound can of INSTANT MERITENE, plus a supply of comprehensive MERITENE Diet Sheets.

Name_____ MD

Address_____

City_____ Zone____ State____

A product of

THE DIETENE COMPANY

MINNEAPOLIS 8, MINNESOTA

outside and yellow and seeded inside. Batter fritters can be made with eggplant.

CASSAVA (*Manihot Ultissina*) or tapioca is the poorest of the root vegetables and is mainly carbohydrate, although Pacific islanders enjoy it and it grows in poor ground. In hospitals, it is used only when there is no alternative.

The Fijians eat all types of meat and fish, but are apt to eat too much bread and too many biscuits. They are also the hardest of all the races on the islands to teach to drink milk in quantity because it has not been used in their villages. The nutritionists are encouraging the use of powdered milk in the villages, and some is now being used in the hospitals.

They eat a great deal of fruit, of which there are many varieties available, including: pawpaw, pineapples, soursop, avocados, mangos, guavas, oranges, lemons, mandarins, bananas, grenadilla, custard apples, rock and water melons, and bread fruit and jackfruit. BREADFRUIT (*Ariocarpus Communis*), which grows on a tree, is a green oval fruit about 5 by 2 in. with a tough knobby skin, yellow flesh, and a large number of seeds. JACKFRUIT also comes from a large tree and is a fruit similar to breadfruit in texture but larger. Both breadfruit and jackfruit are used as vegetables.

Three green vegetables are popular: bele, oata, and China cabbage. OATA is an edible fern which, when cooked, is served with coconut cream. Coconuts are used, usually being grated and squeezed through washed coconut fiber. The green vegetables are then served in this liquid, and the dish is called *lolo*.

There does not seem to be as much obesity among the Fijians as the Maoris of New Zealand, perhaps because the Maoris eat a good deal of fatty pork and mutton birds. These birds are the size of a small hen, rather like a shag to look at, live in the sea cliffs, and feed on fish. Their flesh is very oily, salty, and tough, and takes a long time to cook, with many changes of water. The smell while they are cooking is something to be endured.

Traveling on the Job

The main office of the supervising dietitian is in Suva, but a considerable amount of traveling is involved in this position. Every three months a trip to the other side of Viti Levu, the main island, is made, the visit usually lasting four to six weeks. Lectures and cooking classes are given for nurses, and at the same time a check is made on the administration of the kitchens and rations, and staff problems are discussed. Rural hospitals also receive a visit at this time. Such a trip is usually made in my little Morris Minor, which is always full of saucepans, scales, measuring jugs, bowls, and primus stoves.

Other means of travel are by punt, launch, and flying. The small boats in which one must travel between islands are very small indeed and devoid of comforts, especially if one must spend a night or two aboard. There are no cabins and one sleeps among the native crew, the bunk being a board slung from the side of the wall by chains. To sleep, incidentally, is almost impossible, for these little boats are full of cockroaches, copra bugs, and bed bugs which crawl over the walls and the passengers throughout the night. As there is no place to go but the "bunk," these discomforts must be endured. There are compensations, however. The island of Kandaou is the home of the Fiji parrot, one of the most beautiful birds I have ever seen, with scarlet head, bright green body, and wings and tail of royal blue. Flocks of these birds suddenly flash across one's path with great screeching, especially in the early morning. There are also the scenes of the large outrigger canoes carved out of large tree trunks by the Fijians themselves which are paddled over crystal-clear blue water.

Visiting the Hospitals

In seven of the largest hospital kitchens on the islands, housekeepers are employed. It was my first duty to work with them and gain their confidence. As is frequently the case, the usual barriers greeted the "newcomer." Some of these housekeepers had held their positions for some time and were not too eager to be "remolded." In other hospitals, there were steward clerks and Medical-Officers-in-Charge who think, "Who is this stranger and is she going to be dictatorial and obstructive, or is she going to be helpful?" It has been a wonderful feeling to gain the confidence and cooperation of these people and to be welcome and given helpful information willingly.

Most of the kitchens are staffed by male Indians, who seem to make better cooks and also have more "staying power" than the Fijians. On the other hand, the Fijians make very good vegetable cooks.

The study of equipment in the kitchens in the various hospitals has been intensely interesting, and I have built up quite a library of catalogs and prices from different firms in London. Only two of the kitchens have electric and steam equipment. All others have oil and wood burning stoves. In two of the rural hospitals, there is only an open fire place with large pots strung across the fire on an iron rod, much as it was in pioneering days. Recommendations have been made annually for desirable equipment, together with suggestions for kitchen alterations, with quotations for yearly budgetary estimates.

In working with the staffs of the various hospitals, my plan was to become familiar as quickly as possible with the framework of each hospital. To this end, I obtained the following figures for each hospital:

(a) Average number of patients per month and the number of kitchen employees.

(b) Consumption of food per person per day.

(c) Cost of food per person per day.

(d) Grams of protein served per person per day.

(e) Total cost of rations for each hospital per month. This information now reaches me quarterly.

THE BEST FOOD DESERVES THE FINEST CRACKER

PREMIUM SALTINE CRACKERS *
with NEW GOLDEN GLOW

Your customers will appreciate these finer saltine crackers. They're tastier, flakier and snapping crisp. These top-quality crackers are always perfect in our moistureproof cellophane packets.

**Premium Snow Flake Saltine Crackers in the Pacific States*

SEND FOR FREE BOOKLET AND SAMPLES

National Biscuit Co., Dept 27
425 Park Avenue, New York 22, N. Y.

Name .....

Firm .....

Address .....

City .....

®

Also, the organizational framework of the hospital had to be studied.

I compared my figures with a ration guide prepared by the nutritionists of the South Pacific Health Service, and in many instances found that the food served was woefully small in quantity in relation to need. In most instances, the housekeeper or the person responsible for ordering and issuing stores has been afraid to over-spend the "Ration Vote," with the result that the patients have not received sufficient food, especially protein. It has been part of my work to try to obtain more money for food and then to improve the menus. In particular, I have recommended the introduction of more protein foods in the form of powdered milk, meat, and fish. Cooked teas and suppers have also been inaugurated.

The housekeepers have been given instruction in kitchen management, quantity recipes, and simple bookkeeping, which enables them to record and check receipts and issues. Receiving store rooms have been built and put in the charge of the housekeepers, the stores being purchased from a bulk store under the administration of the Suva Gaol.

Other steps toward improvement in food service have included the hiring of additional employees where meal figures have increased, as well as increases in salaries where deserving cases were apparent.

An effort is now under way to provide the male kitchen staff with white uniforms.

Teaching Nursing Students

A nursing school is operated on Fiji for the training of Pacific Islanders, most of whom are Fijians, Indians, and part Europeans. With the help of the nutritionists of the South Pacific Health Service, lectures on nutrition and diet therapy have been compiled, and suitable stencilled lecture books, including one on practical cookery, have been produced. The lectures are presented in as simple a manner as possible, and include demonstrations with flannel graphs. Island foods and dishes are included. On the whole these student nurses are keen to learn.

In our cooking classes, we use fourteen primus stoves, two nurses to a stove, and other cooking equipment such as one would find in a home science practical classroom. When there is an oven available (which happens in some kitchens), there is great fun, because these students have a hard time standing the suspense of having something cooking behind a closed door.

Diet Therapy

The nutritionists of the South Pacific Health Service have also aided me with ideas on therapeutic diets, so that they will be as simple as possible and use island foods. All are modifications of the normal diet. Diabetic and reducing diets have been printed in Fijian and Hindi. There is no free insulin in Fiji, although patients are given insulin treatment when necessary in hospitals. Therefore, in the diets, the carbohydrate is evenly distributed since insulin treatment is not usually available. The amounts of foods are given in spoonfuls. The diets are standardized to 1800 and 2500 calories.

Other diabetic booklets for Europeans and more intelligent Pacific Islanders who do receive insulin treatment have also been prepared.

The hospitals have no diet kitchens and suitable food is prepared in the regular kitchens, with the diets served in the wards as much as possible. When extras are needed, they are sent from the kitchen in the form of high-protein milk mixtures and fruit drinks. In one hospital this is not yet possible, owing to the shortage of European nurses to supervise the wards.

In traveling among these islands, the need for more public health work has become quite evident to me. In one large Fijian village of nearly two hundred people, almost every inhabitant suffers badly from dental caries. The Fijians also do not realize the importance of sanitation in connection with foods. Flies are endemic and settle on food, but the Fijians do nothing to "shoo" them away. Also, pigs are allowed to wander at will around the village and even into the huts. I gathered from one of the chiefs that his people suffer from stomach troubles. Truly, this is a golden opportunity for the public health worker, and I would like to see one of the New Zealand-trained Fijian nurses assigned to live among the village people to teach them the rudiments of public health. I realize that this would present problems, as the Fijians are still governed by old superstitions and customs. However, I hope that any suggestions I may make can be put to good use in helping these people.

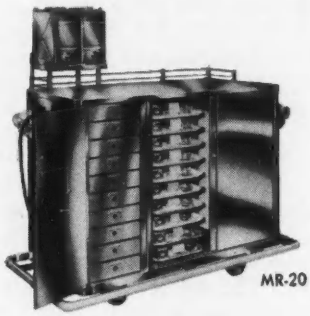
Culture, Economics, and Food Habits

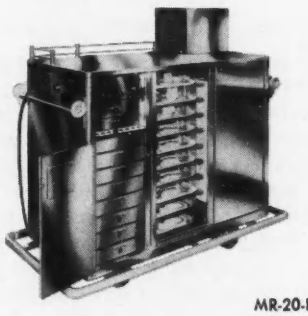
GEORGE S. QUEEN, Ph.D.

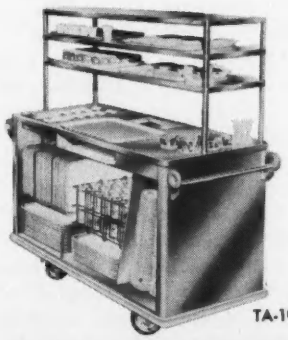
Professor of Social Science
State Teachers College
Brockport, New York

WE SAT at dinner in a clean, pleasant restaurant in Stockholm. Our plates steamed with generous helpings of creamed potatoes, macaroni, and fish lightly browned. The cheese platters, so inevitable in Europe, struggled wanly to lend a pale color down the length of the long table. At either end stood wicker trays heaped high with various kinds of bread. Our dessert, we knew, would be delicious Swedish ice cream topped with red raspberries and whipped cream. But no vegetable salad greeted our American

SEE THEM AT THE SHOW


MR-20


MR-20-B


TA-100

and hear first-hand what the

Meals-on-Wheels System

can do for you

(now in use in over 300 hospitals throughout the country)

Learn how you can —

1. Provide correct food temperatures from kitchen to patient.
2. Economize by eliminating mealtime peaks.
3. Decrease supervision problems through greater simplicity and flexibility of operation (giving you more time for other duties).
4. Profit by using the only *complete* planning and follow-up service—The Meals-on-Wheels System!

Variable capacity available - 16 to 28 patients.

Your visit to Miami won't be complete without seeing our new exhibit Number 321

Meals-on-Wheels System

5001 E. 59th Street • Kansas City 30, Missouri

eyes. For two days, it is true, our menu had, at our request, included green and yellow vegetables and fruits. On this day, however, the food set before our study group was clearly a reversion to the dietary pattern against which a nutrition-conscious few of us had rebelled in the beginning.

Our group leader, an eminent sociologist, asked: "Why do they eat so many starches? Irish potatoes, boiled and creamed; breads, brown and white; crackers, wheat and rye; and macaroni!"

"Perhaps," I suggested, "it is because they grow potatoes and cereals in abundance in Sweden. Isn't it generally true that most peoples eat the staples most readily available to them?"

The professor straightened, and his eyes lighted, as at the challenge of an heretical idea.

"No!" he protested. "A people's food habits are determined by their culture, not by economics."

Since I was neither a sociologist nor a dietitian, I could only answer that as a teaching, non-researching historian, I had put certain accepted economic facts together with certain cultural facts and had arrived, almost unconsciously, at a rather loosely held conclusion on food habits. In the Mediterranean areas, where olive trees grew, I had noted that the people used olive oil profusely in food preparation; in Tsarist Russia, where provender for cattle was usually scarce, meat in the diet was a rarity; and men who lived by the sea generally counted fish as a staple, just as our Plains Indians had subsisted on the herds of buffalo. In short, I said, it seemed obvious to me that most peoples generally based their diets on staples most immediately and abundantly available to them.

"I'm sure you're wrong," the sociologist replied. "Dietary habits are the product of generations of cultural accretion. They grow out of the folkways and mores of a people, which determine what shall be clean and what unclean, what shall and shall not be eaten."

"But, don't you remember," I responded, "how many cheeses we faced at every meal in France—simply because they were available in abundance, a staple food product of *la belle* France?"

"You are just an economic determinist," he declared, as we rose from table to prepare for our scheduled sightseeing. We scarcely renewed the discussion during our European trip, but on our return to the States, he mailed me a reprint of an article he had written some years before, "in favor of historical and cultural, rather than economic, determinism."

Do Cultural Influences Determine Food Habits?

The gist of the article, on the development of the iron ore deposits of the Mesabi Range, was that under two cultures—the soft pad of the Indian's moccasin and the heavy tread of the lumberman's boot—those fabulous ore deposits remained undisturbed. Only with the advent of a more technical culture—railroads, steam-shovels, and so on—were the deposits exploited. With this thesis, which sociologists call the priority of culture, I have no argument. But it seemed to me, as a historian believing in the multiple causation of cultural change, in which the economic factor is but one of many, that economic change had been perhaps the dominant trait in the new, more technologic culture pattern which had made the development of Mesabi possible.

It also seemed to me that the sociologist's thesis of the priority of culture was not necessarily valid when applied to the food habits of a region. The Indians, I reasoned, having a primitive economy, certainly foraged on the land, with a few taboos, perhaps, to limit the utilization of the available fish and game, nuts and berries, and maize fields in the clearings. When the lumberjack came, I reasoned further, he probably relied heavily on rifle and fishhook, supplementing these local food supplies with white man's grub only insofar as transportation permitted. In time, the denuded hills yielded their secret, the iron ore miner appeared, and with him better transportation. By now game was scarce; but the ore miner had no inclination or need to modify his dietary habits. The railroad brought in the food to which he had been accustomed.

Economic Causes of Cultural Patterns

At this point, I felt that I could state a thesis of my own. In a primitive, isolated society, the people subsist on what is immediately available to them, and their food habits become a part of their culture. As the society advances toward civilization and contacts with other peoples increase, diets may be modified and enriched by a new cereal crop, a new farm animal. With the development of transportation, the diet becomes more and more varied, including not only staples of the region but also the products of other climes. In time, the world being opened, emigration occurs. In their new homes the immigrants at first retain the food habits of "home," if transportation allows them to do so. But as time passes, perhaps because of the costs of transportation, local staples supply a greater and greater proportion of their dietary needs, until only culinary touches and tastes survive to remind of "old-country cooking." Further, the economics of income may limit the dietary choice of the low-income immigrant, of the native laborer, to beans instead of beef and bacon.

There was my thesis; it was clearly economic determinism. To defend it, I first consulted sociologist E. A. Ross. That savant seemed obsessed by the theory of the preeminence of culture in shaping the lives of men. I read until I came to a passage in which Mr. Ross speculated on why many South African tribes relied on milk from their cattle for food but never ate the flesh, while certain peoples of eastern Asia maintained large herds for their meat and

For Speedy Return To Normal Nutrition

Meat...

in the congestive phase of cardiac disease

Meat fits well into the moderate-protein, restricted-sodium, acid-ash diet currently recommended for many patients with congestive cardiac failure.[1]

The protein of meat—in the proportionate arrangement of its essential amino acids—closely approaches the quantitative proportions needed to promote human tissue synthesis and repair. For this reason lean meat proves important in maintaining positive nitrogen balance without excessive protein intake.

The sodium content of meat prepared without added salt is relatively low. Per 100 grams, beef muscle meat shows approximately 50 mg. of sodium, lamb 90 mg., pork 60 mg., and veal 50 mg.[2]

The acid ash of meat aids in the promotion of diuresis.

The easy digestibility of meat is a prime requisite of foods specified for the patient with congestive cardiac disease.

In addition to these important features, meat contributes other nutritional factors essential in any convalescence —the B vitamins thiamine, riboflavin, niacin, pantothenic acid, B_6, and B_{12}, and the minerals iron, phosphorus, potassium, and magnesium.

1. Odell, W. M.: Nutrition in Cardiovascular Disease, in Wohl, M. C., and Goodhart, R. S.: Modern Nutrition in Health and Disease, Philadelphia, Lea & Febiger, 1955, p. 699.
2. Bills, C. E.; McDonald, F. G.; Niedermeier, W., and Schwartz, M. C.: Sodium and Potassium in Foods and Waters, J. Am. Dietet. A. *25*:304 (Apr.) 1949.

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

American Meat Institute
Main Office, Chicago...Members Throughout the United States

leather but rarely used the milk (1). I stopped reading. Obviously Ross was a cultural determinist.

I then consulted the "Bible" of my own and derivative fields, *The Encyclopedia of the Social Sciences.* Turning to the article on "Culture" (2), I began reading on "food." The material was practically incomprehensible and I realized that I was eye-to-word with another sociologist. However, it seemed that this one obliquely supported my thesis of the economic determination of food habits. But I was not positive, and a historian in doubt always quotes:

"In all cultures . . . simple staple food is prepared and cooked and eaten according to strict rules . . . manners, rights, and tabus. It is usually obtained by more or less complicated, collectively carried out processes, such as agriculture, exchange or some system of social cooperation. . . These are as indispensable to man's . . . nutritive needs, as the raw materials of food and the processes of its ingestion. For man is so molded that if he were deprived of his economic organization and his implements, he would as effectively starve as if the substance of his foodstuffs were withdrawn from him" (2).

I felt that I was now on the right track. I had an admission—from a sociologist!—that the economic factor was a major, if not *the* determining force in man's choice and preparation of foods. Surely I could find some authority, somewhere, who had put the obvious into words: that, in general, the basic food in any culture is the staple crop of the habitat.

Continuing my search, I pulled thirteen books from the library's shelves, with titles and authors ranging from *Principles* to conservative Sorokin, but not a note did I take. I finally decided that sociologists were just not interested in the *origin* of people's dietary idiosyncrasies.

Perhaps I should consult the anthropologists. Who could be more concerned with people and their habits than the anthropologist? In Robert H. Lowie's *An Introduction to Cultural Anthropology* (3), I found confirmation, not expressed but implied, for my thesis. Native peoples, he says, deserve our "admiration for the way they turn to account such resources as nature allows them." Thumbing through the book, I found many examples of such utilization. A few will serve our purpose. "From Alaska to Puget Sound, the Indians of the coast feed largely on salmon, cod and halibut," whereas the Maricopa of Southern Arizona rely on mesquite beans as the staff of life, cultivate corn as an extra food, and pursue game as of yore. Rice is the staple food in southern Asia, maize among the Indians of North America, and the potato among the Incas; but the Indians of the Amazon utilize the bitter, poisonous manioc, which grows there, after treating it to remove the deadly prussic acid. The Polynesians, suffering from a dearth of mammals, eat dogs and find them highly palatable. And so on. Finally, Lowie, the anthropologist, contrary to sociologist Ross, declares that in the thirteenth century the Mongols, herders of horses, cattle, camels, goats, and sheep, milked the female of all these species, milk being their chief food resource. Anthropologist Lowie bases his statement on historical evidence.

My theory that the diets of primitive peoples were based on availability was further strengthened by Price's book, *Nutrition and Physical Degeneration.* This author had traveled and gathered his data first hand. The diet of the people of the Outer Hebrides, he declares, "consisted chiefly of oat and sea foods, including a wide variety of fish available there. This diet included generally no dairy products since the pasture was not adequate for maintaining cattle. Oat grain was the only cereal that could be matured satisfactorily in that climate. Some green foods were available in the summer and some vegetables were grown and stored for the winter" (4). This diet of fish, oatmeal, and vegetables was credited with giving the Outer Hebrideans high immunity from dental caries. In short, Dr. Price concludes that primitive peoples with a high survival quotient often choose from the natural foods available to them a daily fare of extraordinary excellence.

In *National Geographic Magazine,* I discovered that the happy, healthy Hunzas of the higher Himalayas ate the food grown in their own valleys. "Potatoes, some vegetables and a little grain. But fruits and nuts are the most important," declared a chieftain (5). From a delightful article on "Old-Fashioned Foods" in *House Beautiful* (6), I learned why the boar's head gradually lost the proud position of honor which it had attained at Christmas feasts in medieval England. Was it cultural change? No, indeed! The colorful festal custom fell into disuse, says the author, "probably because the supply of wild boars ultimately gave out" (6). Remember, this was before the cultivation of turnips for livestock provender, and the domesticated boar had to be butchered not later than November, ere the winter. Further, out of thirty-two food items listed as familiar to the American frontier, I found only four not homegrown and immediately available to the settler: coffee, tea, soda, and spices.

The reader surely has agreed with me by now that it is economics rather than social custom which largely determines food habits in primitive and semi-self-sufficient societies. The idea makes sense, even to a fourth grader in New York City who wrote as follows in a composition on "The Africa Unit" (7):

> The African people are very different . . .
> They have different color from us . . .
> They speak a different language . . .
> They eat a different kind of food [The child goes on, logically] . . .
> They eat what is around them.
> We eat what is around us.

Libbey Glass appeals to all five senses...

sight:

they see it! In a bright, sparkling Libbey glass a drink looks better . . . more tempting . . . more satisfying. Libbey's wide choice of patterns gives you attractive glassware for every need . . . crested, if you want, for distinction.

taste:

they taste it! Customers taste *only* the ingredients you put into the glass—never the glass itself. Glass is inert and never imparts flavor to the beverage. Libbey's lovely crystal clear glasses help drinks taste better because they look better. Libbey tumblers and matching stemware add tasteful unity to your bar and dining service, too.

touch:

they touch it! A cool or frosty glass is the perfect start towards drink enjoyment. Libbey glassware feels good in the customer's hand, is balanced just right. And Libbey offers the right glass for every drink.

smell:

they smell it! Customers get only the delightful bouquet of the beverage . . . never any foreign odor from inert glass. Libbey glassware is easy to keep sparkling clean without danger of chipped rims because of the famous Libbey "Safedge" Glassware rim.

sound:

they hear it! The musical sound of ice in a Libbey glass just naturally means thirst satisfaction. It's a sound idea to use Libbey Safedge Glassware for all your beverage requirements.

Columbian Tumbler, Iced Tea Glass, HT-1806, 12-oz. This handsome pattern is available in 9 sizes.

Nothing takes the place of a Libbey glass in beverage service

Because of its *sense-appeal*, it's natural for your customers to appreciate beverages served in a Libbey glass . . . to *expect* it.

Libbey Safedge Glassware is the ideal service for all beverages . . . combining sense-appeal with amazing durability and economy. In restaurants throughout the country, Libbey Heat-Treated glasses have been tested and proved to give the highest average number of servings per tumbler . . . which means a per serving cost to you *measured in fractions of a cent per 1000 servings.*

The complete Libbey line means the right glass for every need . . . tumblers and matching stemware to unite dining and bar service . . . a wide variety of lovely patterns and sizes . . . crested with your monogram or insigne for distinctive identification . . . extremely durable glassware for economical operation, with every glass backed by Libbey's famous guarantee: "A new glass if the rim of a Libbey 'Safedge' glass ever chips."

That's why it makes good sense to serve *all* beverages in Libbey Safedge Glassware. Find out how Libbey can mean savings and profits in your operation. Call your Libbey Supply Dealer today, or write to Libbey Glass, Division of Owens-Illinois, Toledo 1, Ohio.

LIBBEY SAFEDGE GLASSWARE
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

Influence of Transportation

As a corollary to my main thesis, I have suggested that as transportation improved and contacts with the outside world increased, luxury foods were among the first imports of an old society. History records how the Crusaders to the Holy Land developed a taste for spices, such as cinnamon. Every schoolboy knows the story of how Montezuma proudly presented chocolate to Cortez—and to Europe—as a drink fit for a God.

Among native peoples, the economics and consequently the dietary impact of transportation, and the white man it brought, is clearly reflected in the agriculture of islands of the Pacific. Today, Pacific Islanders in many instances neglect the old subsistence crops to buy "frozen and tinned meats, vegetables, butter, preserved milk . . ." because commercial crops are more profitable. Transportation is another obvious triumph of economics over custom (8, 9).

Emigrants Introduce New Food Habits

A secondary corollary to my thesis—that emigrants carry their established food habits to a new home; that they retain them insofar as the native food resources and transportation permit; but that their diet gradually conforms to the food resources of the new homeland—is clearly supported by a medical survey of nutrition in Newfoundland, made in 1944 (10). "The diet of the large majority of the inhabitants . . . is necessarily monotonous. Local production of food is limited to a few items . . . because of the harsh climate and the poor fertility of the soil, and difficulties of transportation . . . restrict the imported foods to the relatively imperishable staples." The study goes on to show the effects of these economic handicaps on native diet by a comparison of local food consumption with that of Canada. In 1943, the per capita consumption of dairy products, for example, was 15.8 lb. in Newfoundland, compared with 64.3 lb. in Canada; but of fish and game (the chief industry), 71.0 lb. compared with 26.2 lb. in Canada; and so on. One statement summarizes the situation: ". . . the poor fertility of the land, lack of adequate transportation and extensive poverty have led . . . to food habits which are distinctly bad."

Studies of the diets of immigrant families in the United States, it is true, reveal nutritional deficiencies which apparently result from cultural factors, such as the loyal preference for "old country" staples, recipes, flavoring, and cooking methods. Yet closer analysis shows that fundamentally the problem of these immigrant families is economic. Newcomers from Southern Europe, for example, cannot indulge their taste for the old familiar cheeses, fruits, and dark breads, simply because these foods, which were cheapest at "home," are most expensive in the American pay-envelope society.

Income exerts a big influence on the dietary patterns of native Americans, also. The 1940 *U. S. Yearbook of Agriculture* holds (11) that the protective foods—fresh fruit, green vegetables, eggs, and milk—were inadequate in 1940 in the diets of low-income groups "not only in the United States but apparently in all highly industrialized countries." The author also speaks of a "high income food-consumption pattern," clearly implying dietary differences based on income.

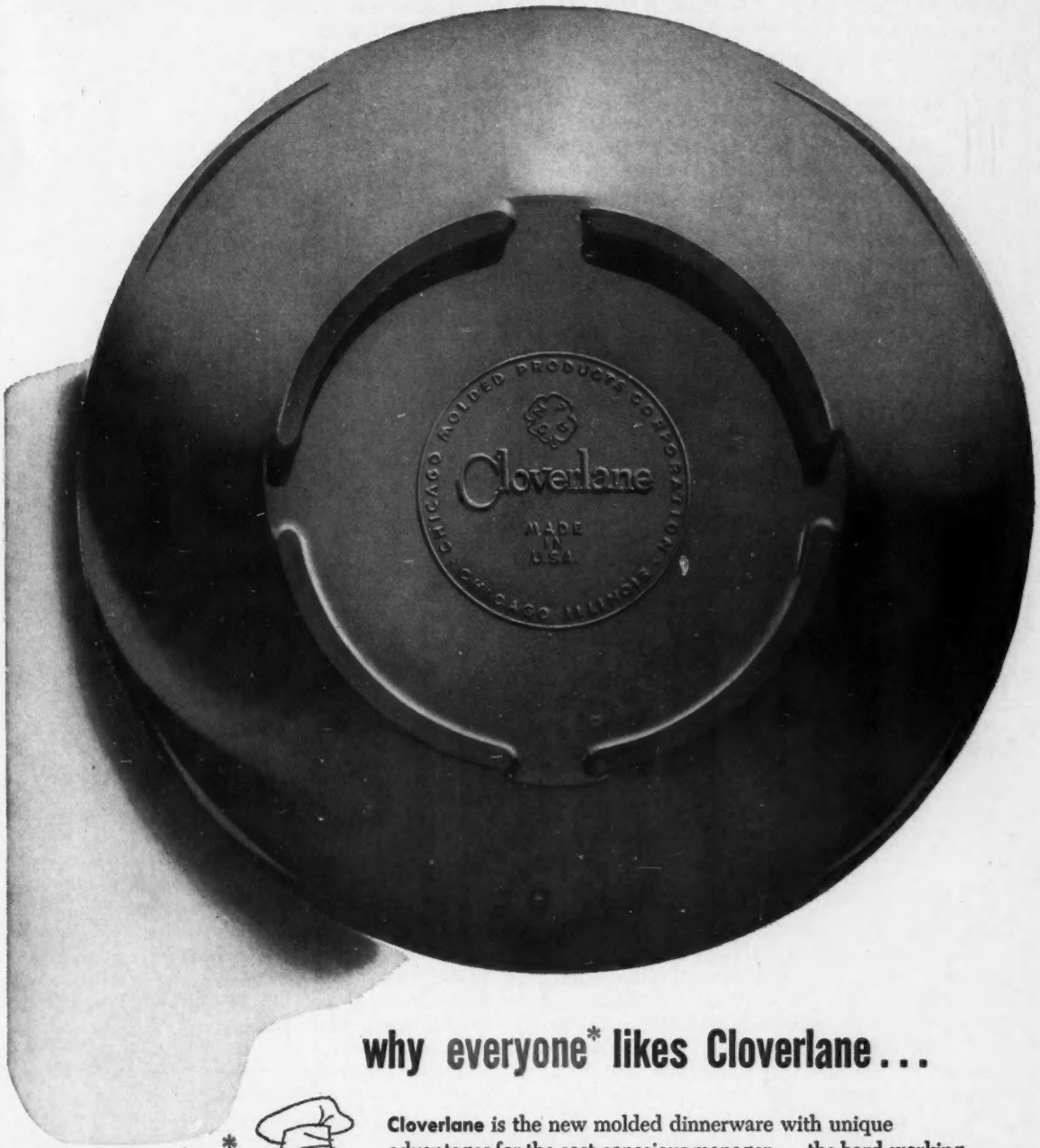
A quasi-governmental source, the National Research Council (12), lists four chief causes of malnutrition among industrial workers. "Inadequate income" is first, while "poor food habits" is second. But the study, obviously written by a sociologist, stresses the need for education to improve food habits among workers who, according to the survey, bought few vegetables and little whole-grain bread. However, he concludes, "one must expect slow progress through education, primarily because food likes and dislikes are generally ingrained, being the result of custom, taste, and tradition."

Despite the evidence I have collected in refutation, here is a sociologist clinging to the same old theory of cultural determinism which had challenged me in Stockholm. Yet he speaks as one having authority, and even a vegetating historian respects authority, albeit a sociological authority. Plainly, the problem required some thought. At length, I brightened; I had a solution (very useful in my profession): "The sociologist is right, but . . ."

That sociologist was right, but . . . he did not go far enough back into history. He wrote of food habits as they have been and are being *perpetuated*, not as they *originated*, not as they were *determined*, long, long ago. Custom and tradition may tend to regularize and preserve the existing dietary pattern of a society. But do custom and tradition originate habits or initiate change, any more in food folkways than in that almost equally vital diversion, lovemaking?

The Theory Restated

May we not, then, restate the theory of the formation of food habits as follows? In a primitive, self-sufficient society, a people, circumscribed by their economic environment, consume what is about them. Gradually, the mores restrict, and tradition tends to perpetuate the food habits and tastes of old. Cultural determinism is strong at this stage. Later, as the society emerges from isolation, the economic factor comes into operation again. Transportation, new methods of production, changes in income distribution, bring range and variety to the choice of foods. Given impetus by economic change, the process of dietary change may be hastened by intellectual and esthetic factors. The gourmand is warned to eschew; the good hostess is alerted to food colors; the common man is advised to include the Basic 7—all to the end of living longer and happier, but



why everyone* likes Cloverlane...

Chef—I like the way Cloverlane keeps foods hot or cold longer. *

Manager—Cloverlane's longer life keeps replacement costs way down. *

Diner—I'm in love with Cloverlane's high style. It's as beautiful as the dinnerware I use at home. *

Cloverlane is the new molded dinnerware with unique advantages for the cost-conscious manager . . . the hard-working kitchen staff . . . and the style-wise diner.

Its high-gloss melamine surface comes clean quickly . . . its light weight cuts the work load . . . special convex bottoms and aerated bases aid drainage, encourage air circulation when stacked. Handling is quiet, almost silent . . . and *Cloverlane* is practically indestructible.

Get all the money-saving, work-saving facts about* Cloverlane, *now. Write to:

Dinnerware Division

CHICAGO MOLDED PRODUCTS CORP.

1014

with an increasing impact on the patterns of food consumption.

So, both the sociologist and the historian are right, as an article in *Business Week* proves (13). In "It's a Revolution in Eating Habits," the writer offers four reasons for the rapid changes of recent years, hints of which the *Agriculture Yearbook* of 1940 (11) had noted. The first reason is economic. People have more money to spend, have greater range of choice. The second is semi-sociologic. The homemaker often working, emancipated, is chef rather than drudge and buys selectively both for meal balance and quick preparation. Health is given as another reason for radical changes in food consumption. During the war Uncle Sam made the homemaker conscious of the Basic 7; and today the insurance companies and the song writers make us fear obesity. Fourth, industry is a leading "old revolutionary" in the overthrow of hoary dietary patterns. In offering foods attractively packaged, frozen, and pre-cooked, the food industry offers what seems to me final and irrefutable evidence in support of my theory of the predominance of the economic rather than cultural determination and modification of the food habits of a people.

References

(1) Ross, E. A.: Principles of Sociology. 3rd rev. ed. N. Y.: Appleton-Century-Crofts, 1938, p. 103.
(2) Malinowski, B.: Culture. *In* Encyclopedia of the Social Sciences. N. Y.: Macmillan Co., 1931.
(3) Lowie, R. H.: An Introduction to Cultural Anthropology. 2nd ed. N. Y.: Farrar & Rinehart, Inc., 1940.
(4) Price, W. A.: Nutrition and Physical Degeneration. A Comparison of Primitive and Modern Diets and Their Effects. Redlands, Calif.: The author, 1945.
(5) Shor, J., and Shor, F.: At the world's end in Hunza. Natl. Geog. Mag. 98: 485, 1953.
(6) Harris, J.: Old-fashioned foods. House Beautiful 93: 134 (Dec.), 1951.
(7) Cartwright, M.: The Africa unit. The Social Studies 44: 265, 1953.
(8) Johnston, W. B.: Land, people, and progress in the Cook Islands. Economic Geography 29: 107, 1953.
(9) Johnston, W. B.: Pacific island agriculture: the contemporary position of Western Samoa and some wider implications. Economic Geography 29: 26, 1953.
(10) Adamson, J. D., Jolliffe, N., Kruse, H. D., Lowry, O. H., Moore, P. E., Platt, B. S., Sebrell, W. H., Tice, J. W., Tisdall, F. F., Wilder, R. M., and Azmecnik, P. C.: Medical survey of nutrition in Newfoundland. Canad. M.A.J. 52: 227, 1945.
(11) Farmers in a Changing World. Yearbook of Agriculture. Washington, D. C.: Govt. Printing Office, 1940, pp. 332, 338.
(12) Comm. on Nutrition of Industrial Workers, Food and Nutrition Bd.: The Nutrition of Industrial Workers. Natl. Research Council Bull. No. 123, 1945, p. 12.
(13) It's a revolution in eating habits. Business Wk. No. 1201: 38 (Sept. 6), 1952.

International Dietetics—Past and Future[1]

Mary K. Bloetjes, Ph.D.[2]

Head, Department of Institution Management
New York State College of Home Economics, a Unit of State University of New York at Cornell University
Ithaca

Interest in international affairs is currently reflected in many professions in the United States. During the summer of 1956, forty-six different international congresses were held in various countries throughout the world (1), representing such professions as pediatrics, radiology, entomology, internal medicine, and dietetics. These congresses were held in Denmark, Mexico, Canada, Spain, and Italy, respectively.

The values derived from attending and participating in such congresses may be far reaching. Broad understanding and the acceptance of national differences may result from such an exchange. Members of each national organization may learn to understand their colleagues from other countries and carry back to their homelands new insights which they communicate to their students, families, and friends.

[1] Presented at the 27th Annual Meeting of the New York State Dietetic Association in Utica, on May 2, 1957.
[2] Member, Program Planning Committee, Second International Congress on Dietetics, 1956.

International Congress on Dietetics

Interest in international congresses among the many professions is evident in our own profession of dietetics and has grown rapidly since World War II as a result of nutrition surveys and emergency feeding programs established in other countries. Expanding systems of communication, the exchange of students in the field of dietetics, and an increase in travel facilities have given further impetus to this interest. Dietitians from the U. S. have already participated in two international congresses on dietetics and are looking forward to a third in 1960.

A resumé of the development of these congresses may give us an appreciation of the progress we have made in developing our professional relationships. In an editorial in the February 1947 issue of the JOURNAL OF THE AMERICAN DIETETIC ASSOCIATION (2), Diana Ten Haaf, then President of the Dutch Dietetic Association, is quoted as expressing a need for an international dietetic association. Miss Ten Haaf presented a plea for the establishment of such an organization.

The February 1952 issue of the JOURNAL reported (4) that many members of The American Dietetic Association had received a preliminary program from the Netherlands Dietetic Association announcing the First International Congress of Dietetics to be

HURRY DEAR! HOW FAR IS IT TO TOWN?
BLAKESLEE KITCHEN MACHINES HAVE MORE OUTSTANDING FEATURES
G.S. BLAKESLEE & CO.
1844 S. LARAMIE AV. CHICAGO
Lost at 300 r.p.m.

held that summer in Amsterdam. A report of this congress by Dr. Margaret A. Ohlson, who attended as our official representative, appeared in the September 1952 issue of the JOURNAL (4). The purpose of this Congress was to provide an opportunity to exchange views on (a) the methods of applying the findings of basic nutrition to the welfare of the people and (b) the problems of training and organization arising from the growth of the dietetic profession. Thirty-one nations were represented by those who attended. Thirty-five of these were members of or associated with The American Dietetic Association.

Dr. Ohlson pointed out the opportunity open to state associations to work with the dietitians in other countries, through such activities as donating books for libraries and making contacts for those interested in study in the United States.

A subsequent meeting, the Second International Congress on Dietetics was held in Rome in September 1956 to strengthen the foundations that had been laid four years earlier in the Netherlands. Over six hundred persons from thirty-six countries were registered, 135 of whom were from the U. S.

Organizing an International Congress

The work of organizing, planning, and conducting an international congress involves some techniques which are not characteristic of a national, state, or local meeting in the United States. Financial funds must be obtained or guaranteed in advance to establish facilities for administering the pre-congress arrangements. A budget plan must be established and a financial committee appointed to arrange for the transfer of accrued funds between various countries so that they may be used for future congresses. Qualified language interpreters are needed so that papers may be presented simultaneously in various languages and translations of these papers completed, verified, and made available for publication.

Participation of member nations in the planning of the program gives balance to the program and provides an opportunity for various national viewpoints to be expressed. Also, speakers from the various countries are needed to give an understanding of national differences between and significant similarities among the various professional organizations represented. Thus, the organizing committee deals with various factors concerned with the mechanical arrangements of the congress as well as the program.

Future Trends

There are many indications that we shall continue to have international congresses and the exchange of ideas among professions as we have in the past (5). The several government programs established by Congress through the Fulbright Act, the Smith-Mundt Act, and others, have provided means by which this exchange can be further accelerated and continued. There is every indication that more funds will be made available by individuals, various private agencies, foundations, and governmental legislation. An imposing list of such agencies in the *Handbook on International Study* of the Institute of International Education gives evidence of the interest and opportunities offered (6).

There are other trends which further support the work of these agencies concerned with international exchange. Travel facilities and accommodations are improving, and travel time between countries is being reduced. Interest in foreign languages is increasing, and correspondence between nations has been encouraged and arranged by groups interested in establishing and strengthening international ties.

Many opportunities are available to those who wish to use them. The Institute of International Education in New York City is a central agency engaged in strengthening various educational and professional fields and will assist in establishing these relationships for the individual. As representatives of the profession of dietetics, we should be interested in using these opportunities, for they can materially strengthen our cultural and professional relationships.

Summary

International interest has grown in many professions. Strengthening our international professional ties makes our professional work more effective on a world basis and also has far reaching influence in our relationships outside of our professional field. International congresses provide concrete means by which we can effectively strengthen these ties.

There are many factors to be considered in planning and conducting an international congress which contribute to our international professional growth. Our appreciation of these factors will stimulate us to assist in planning such meetings in the future.

More opportunities in international exchange are developing through a variety of channels. The recognition and exploration of these opportunities by the individual, together with membership support of our own international congresses of the future, should materially strengthen and develop the realistic and achievable professional goals we have set for ourselves.

References

(1) Meetings. Scient. Month. 83: viii (June); vii (July); vi (Aug.), 1956.
(2) The International Dietetic Association. J. Am. Dietet. A. 23: 126, 1947.
(3) International Dietetic Association. J. Am. Dietet. A. 28: 178, 1952.
(4) OHLSON, M. A.: Report to the members of The American Dietetic Association on the International Congress of Dietetics. J. Am. Dietet. A. 28: 819, 1952.
(5) American Council on Education: Higher Education & Natl. Affairs 6: 1 (Feb. 14), 1957.
(6) Handbook on International Study, 1955. N. Y.: Inst. of Intl. Education, 1955, pp. 163–205.

NEW FOOD CARRIER

DESIGNED ESPECIALLY FOR THE REVOLUTIONARY

ALOE 3-POINT FOOD SERVICE SYSTEM

This new Aloe Food Carrier is the key unit in the Aloe 3-point Food Service System which . . .

(1) *Brings appetizing food to each patient's bedside with hot foods still kitchen-hot, and cold foods cold and firm.*

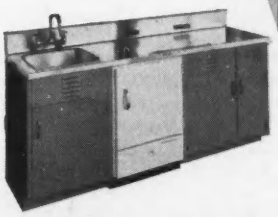
(2) *Preserves the delayed meal.*

(3) *Provides separate transport for soiled trays and dishes.*

Only the Aloe 3-point System provides *all three* of these essentials. It can help you serve better, tastier food at less cost per patient meal, with a substantial savings in time, personnel and space. And while the equipment is designed to be used as a system, each unit *can* be purchased and used separately to improve your present food service.

Mail the coupon today for complete details, without cost or obligation, of course.

The ALOE FOOD CARRIER—*One side for hot dishes, the other for cold, and convenient drawers that help organize servings and maintain temperatures because there are no doors to open. Individual servings can be supervised at the kitchen and then delivered at desired temperatures.*



The ALOE SERVICE PANTRY

Hot and cold compartments as in the Carrier. Built-in electric receptacles. Delayed meals can be preserved in this unit until patient is ready. Perfect for the occasional between-meal service.

The ALOE SOILED TRAY TRUCK

Returns soiled trays and dishes direct to dishwasher, avoiding possible soiling and contamination of the fresh food carrier and speeding service.

a. s. aloe company
World's Foremost Hospital Supplier

14 FULLY-STOCKED DIVISIONS COAST TO COAST

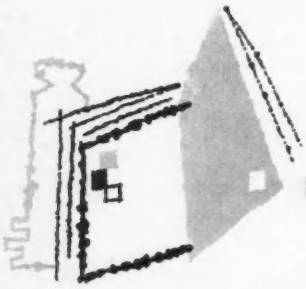
Food Service Division, A. S. Aloe Company
Dept. 14J
1831 Olive St., St. Louis 3, Mo.
Please give me details on the revolutionary Aloe 3-point Food Service System.

Name_____ Title_____

Hospital_____

Address_____

City_____ Zone____ State_____



BOOK REVIEWS

The Freezing Preservation of Foods. Volume 1—Freezing of Fresh Foods. 3rd completely revised and augmented edition. By Donald K. Tressler, Ph.D., and Clifford F. Evers. Westport, Conn.: The Avi Publishing Company, Inc., 1957. Cloth. Pp. 1214. Price $18.

Volume One of this third completely revised and augmented edition is devoted to the freezing of fresh foods. In many respects the book seems to be written for use by industry but the home and the laboratory are not ignored. It is not primarily a "how to do it book" but rather contains information on "how it is done." Rather than a guide to be followed in opening a processing plant, it is a source of information to be used in solving problems which may arise in the operation of such a plant. The material will also be of value to the student, the dietitian, the teacher, and others interested in the scientific aspect of freezing foods. Illustrations, graphs, and charts are extensively used; tables of information are included wherever appropriate; and a bibliography is given at the end of each chapter.

The authors have had wide experience in the field of frozen foods and their statements are well documented, giving the reader assurance that the material is reliable. An amazing amount of literature has been reviewed by the authors but extensive use has been made also of specialists in the various areas of frozen foods. Six of the thirty-one chapters were contributed by well known workers in the field. Others served as consultants, read parts of the manuscript, or offered advice in order that the book might be up to date. When differences in opinions were found, these are presented and the reader is free to evaluate these differences.

As an example of the wide range of material included in the book, one finds consideration given to: how blanching time affects the volatile aldehyde and ethanol content of stored broccoli; the advantages of dehydrofreezing of fruits and vegetables; points to consider in selecting home food freezing and storage equipment; the importance of frozen food locker plants; how to freeze mushrooms; the nutritive values and microbiology of frozen foods; and cooking and serving frozen foods.

In the appendix are fifty-eight pages of directions for testing quality of food, packaging material, and equipment.

It is difficult to think of a subject related to the freezing of fresh food which is not touched upon in this valuable source book. It would seem that access to it should be a "must" for all persons interested in the scientific aspects of the preservation of foods for freezing.—*Gladys E. Vail, Ph.D., Head, Department of Foods and Nutrition, School of Home Economics, Purdue University, Lafayette, Indiana.*

Real French Cooking. By Savarin, translated by E. M. Hatt. Garden City, New York: Doubleday and Co., Inc., 1957. Cloth. Pp. 399. Price $4.50.

This amusing and entertaining book, by one of the world's foremost food experts, belongs in the library of every good cook. Its delightful illustrations lead the reader on to equally delightful stories and anecdotes.

For this JOURNAL, of course, information must be given about the book's attempt to standardize recipes and make them easy to use. In this respect, some criticism is in order. Measurements are given variously in cups, "walnuts," gills, ounces, pounds, or most frequently, not at all. Seldom are oven heats specified, and cooking time is often vague. It is, therefore, probably not suitable as a gift for a bride or a dietetic intern, unless she is also an enthusiastic cook with an adventurous turn of mind.

Real French Cooking has an appeal, nevertheless, to good cooks based on its suggestions of new ways to prepare familiar foods, new flavor combinations, and ways to prepare at home, dishes popular in good French restaurants. Some of these favorites are mousseline sauce, quiche Lorraine, bouillabaisse, tournedos, chaudfroid of poultry, and crème renversée.

The chapter on wines can be useful to those not familiar with many French wines. This writer believes in becoming familiar, also, with wines produced in the U. S., ordering and buying them frequently, in order to encourage this ancient industry, youthful only in the U. S. *Real French Cooking* makes it clear that the use of wines in cooking makes the difference between good flavor and superb flavor. —*Virginia Monahan Bayles, % Dr. Spencer Bayles, Baylor University College of Medicine, Houston.*

RECENT BOOKS RECEIVED

Light, Vegetation and Chlorophyll. By J. Terrien, G. Truffaut, and J. Carles. N. Y.: Philosophical Library, 1957. Cloth. Pp. 228. Price $6.

Carotene: Its Determination in Biological Materials. By V H. Booth. Cambridge, England: W. Heffer & Sons Ltd., 1957. Cloth. Pp. 119. Price 18 shillings.

Encyclopedic Guide to Nursing. By Helen F. Hansen, R.N. New York: The Blakiston Division, McGraw-Hill Book Company, Inc., 1957. Cloth. Pp. 406. Price $6.

Vitamin A. By Thomas Moore, Sc.D. and D.Sc. Amsterdam: Elsevier Publishing Company, 1957. Cloth. Pp. 645. Price $14. (U. S. distributor: D. VanNostrand Company, Inc.)

Quantity Buying Guides—Meats, Fresh Fruits and Vegetables. Revised edition. By Adeline Wood. New York: Ahrens Publishing Company, Inc., 1957. Cloth. Pp. 128. Price $3.95.

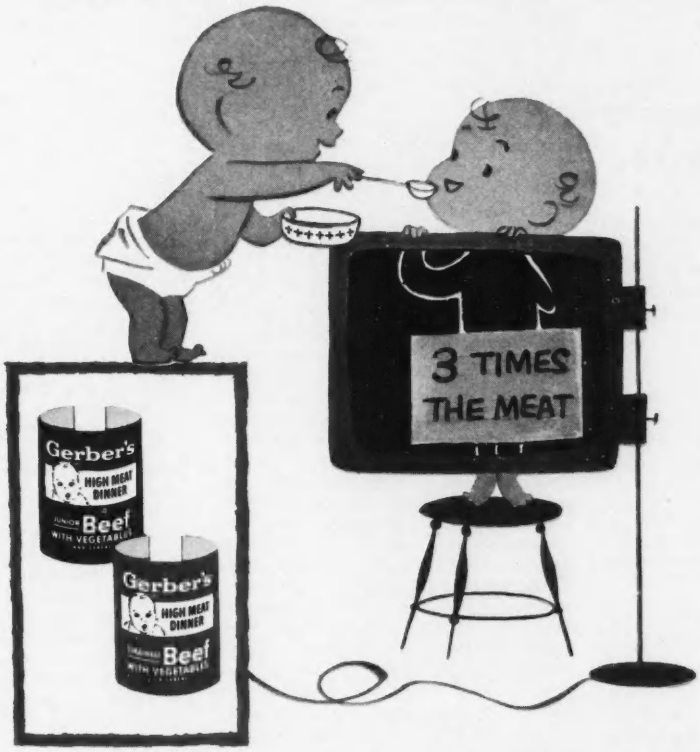
Practical Nutrition. By Alice B. Peyton. Philadelphia: J. B. Lippincott Company, 1957. Cloth. Pp. 379. Price $3.60.

Bibliographies on Nursing. Volume II—Nutrition and Diet, Pharmacology. New York: National League for Nursing, 1957. Paper. Pp. 104. Price $2.

Human Protein Requirements and Their Fulfilment in Practice. Proceedings of a Conference in Princeton, United States (1955). Sponsored jointly by the Food and Agriculture Organization of the United Nations (FAO), World Health Organization (WHO), Josiah Macy Jr. Foundation, New York. Edited by J. C. Waterlow and Joan M. L. Stephen. Bristol, England: John Wright & Sons Ltd., at the Stonebridge Press, 1957. Paper. Pp. 193. Price 10 shillings ($2.00 U.S.).

A Textbook of Dairy Chemistry, Volume One—Theoretical; Volume Two—Practical. Third edition revised. By Edgar R. Ling, Ph.D., M.Sc. (Lond.), F.R.I.C., A.R.C.S. New York: Philosophical Library, 1957. Cloth. Vol. I, pp. 227; Vol. II, pp. 140. Price $12 per set.

Soil. The 1957 Yearbook of Agriculture. Edited by Alfred Stefferud. Washington: Government Printing Office, 1957. Fabricoid. Pp. 784 + xii. Price $2.25.



new way to increase protein in infant diets

Gerber's HIGH MEAT Dinners

Nutritionally advantageous. Gerber's new Strained and Junior High Meat Dinners have *3 times the meat* – much more protein than *regular Vegetable and Meat Combinations. The extra meat, plus selected vegetables and cereal ingredients, provides a variety of wholesome nutrients and unusual flavor interest all in one main dish.

Protein content: each container has a minimum protein content of 7% – the major portion of which is high quality animal protein.

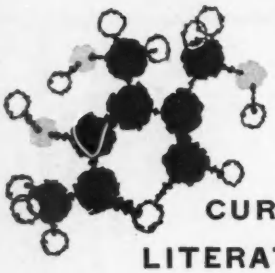
Gerber® Baby Foods
FREMONT, MICHIGAN

ANALYSIS OF NUTRITIVE VALUES IN GERBER'S HIGH MEAT DINNERS

High vitamin-A values.
Excellent sources of niacin.
Good sources of complete proteins.
Good sources of iron.
Significant sources of thiamine.
Significant sources of riboflavin.

GERBER'S HIGH MEAT DINNERS STRAINED & JUNIOR

Beef with Vegetables
Chicken with Vegetables
Veal with Vegetables



CURRENT LITERATURE

Contributed by Janette C. Carlsen and Ethel M. Miller, The Johns Hopkins Hospital, Baltimore; Elizabeth H. Tuft, Chicago Wesley Memorial Hospital; Clara Karl, University of Chicago Clinics; and the Journal staff

THE AMERICAN JOURNAL OF CLINICAL NUTRITION

Vol 5, July–August, 1957

* The effects of endocrine imbalances on vitamin requirements. J. Meites, Y. S. L. Feng, and A. M. Wilwerth.—p. 381.
* Effects of growth hormone on protein and carbohydrate metabolism. J. A. Russell.—p. 404.
* The relationship of vitamin B_{12} to carbohydrate metabolism and diabetes mellitus. B. F. Chow and H. H. Stone.—p. 431.
* Goitrogenic substances in food. M. A. Greer—p. 440.

Vitamin Requirements. An increased intake of vitamins may be beneficial when either a marked excess or deficiency of certain hormones exists. An increased intake of vitamin B_{12}, thiamine, pyridoxine, or the addition of small amounts of vitamin-sparing antibiotics in the diet enhanced the ability of young rats to withstand large doses of cortisone, thyroid substances, thiouracil, diethylstilbestrol, as well as adrenalectomy, thyroparathyroidectomy, or alloxan diabetes. Growth hormone has been shown to increase the need for several vitamins, although it does not appear to increase requirements for vitamin B_{12}. An increased vitamin intake during marked hormonal excesses or deficiencies is usually accompanied by greater appetite and improved efficiency in utilizing food for growth and maintenance. In this present work the increased need for several of the B vitamins, when large doses of cortisone are given, was studied. When large doses of cortisone are given to vitamin B_{12}-deficient animals, there is a decrease in insulin secretion and little carbohydrate is left for anabolic purposes. When large cortisone doses are given to animals with abundant vitamin B_{12}, there is an increase in insulin secretion and proper carbohydrate utilization. It is difficult to understand why large doses of cortisone do not increase the body retention of vitamin B_{12} needed for carbohydrate metabolism. The metabolism of riboflavin, pyridoxine, pantothenic acid, biotin, niacin, and folic acid have been reported unchanged by cortisone, and several were not altered by adrenalectomy. It has been shown that vitamin B_{12} renders cortisone less effective, and thiamine renders it more effective in increasing nitrogen and urinary losses. It is suggested that sufficient thiamine be given to patients during cortisone or ACTH treatment.

Growth Hormone. The growth hormone is believed to be instrumental in the retention of nitrogen in body tissues, especially when the supply of exogenous protein or of carbohydrate is restricted. When the supply of carbohydrate is limited, its oxidation is also diminished and that of fat is increased. It is supposed that this shift in metabolism is due to the growth hormone. It is felt that the rate of secretion of this pituitary hormone is not constant and can be augmented when it is needed to conserve carbohydrate and nitrogen.

Vitamin B_{12} in Diabetes. It is known that vitamin B_{12} plays a role in the utilization of carbohydrates. Weanling rats fed a diet high in carbohydrates and low in fat require more vitamin B_{12} for growth. The administration of glucose in rats results in a decrease in vitamin B_{12} levels of plasma or liver. Vitamin B_{12} deficiency causes hyperglycemia which is correctable with vitamin B_{12}. It was found that corticotropin or cortisone causes hyperglycemia and destruction of vitamin B_{12}-binding substances in muscles as well as an elevation of the vitamin B_{12} serum level. Thyroidectomy decreases absorption of vitamin B_{12}. It has been found that diabetic patients without retinopathy excrete a significantly smaller amount of an orally administered radioactive vitamin B_{12}-test dose than do nondiabetic subjects or diabetic patients with retinopathy.

Goitrogenic Substances. An active goitrogen has so far been isolated in only two edible plants, rutabagas and turnips. The active anti-thyroid agent in these vegetables has been identified as goitrin. It is present in the plant and in the seeds as progoitrin, an inactive compound. It is liberated from progoitrin through specific enzymatic hydrolysis by an enzyme in the plant or seed itself. Cooking destroys this enzyme and thus prevents the formation of goitrin. It is improbable that goitrogenic foods are an etiologic factor in most goitrous patients.

AMERICAN JOURNAL OF MEDICINE

Vol. 23, July, 1957

* Fructose and diabetes. J. A. Moorhouse and R. M. Kark.—p. 46.
* The management of hepatic coma in relation to protein withdrawal and certain specific measures. W. H. J. Summerskill, S. J. Wolfe, and C. S. Davidson.—p. 59.
* The "dieting depression." Incidence and clinical characteristics of untoward responses to weight reduction regimens. A. J. Stunkard.—p 77.

Fructose and Diabetes. The metabolic effect of fructose has been studied in one healthy subject and in eight diabetic patients by observing their metabolic balance while feeding them continuously with a synthetic liquid diet containing fructose as the sole carbohydrate. Insulin was withdrawn during the experiment. In the patients with milder diabetes, there was an improved utilization of carbohydrate, and with this, improved utilization of fat and protein. In the patients with severe diabetes, fructose administration was ineffective. Continuous oral feeding of fructose is impractical and it is felt that fructose has little therapeutic usefulness.

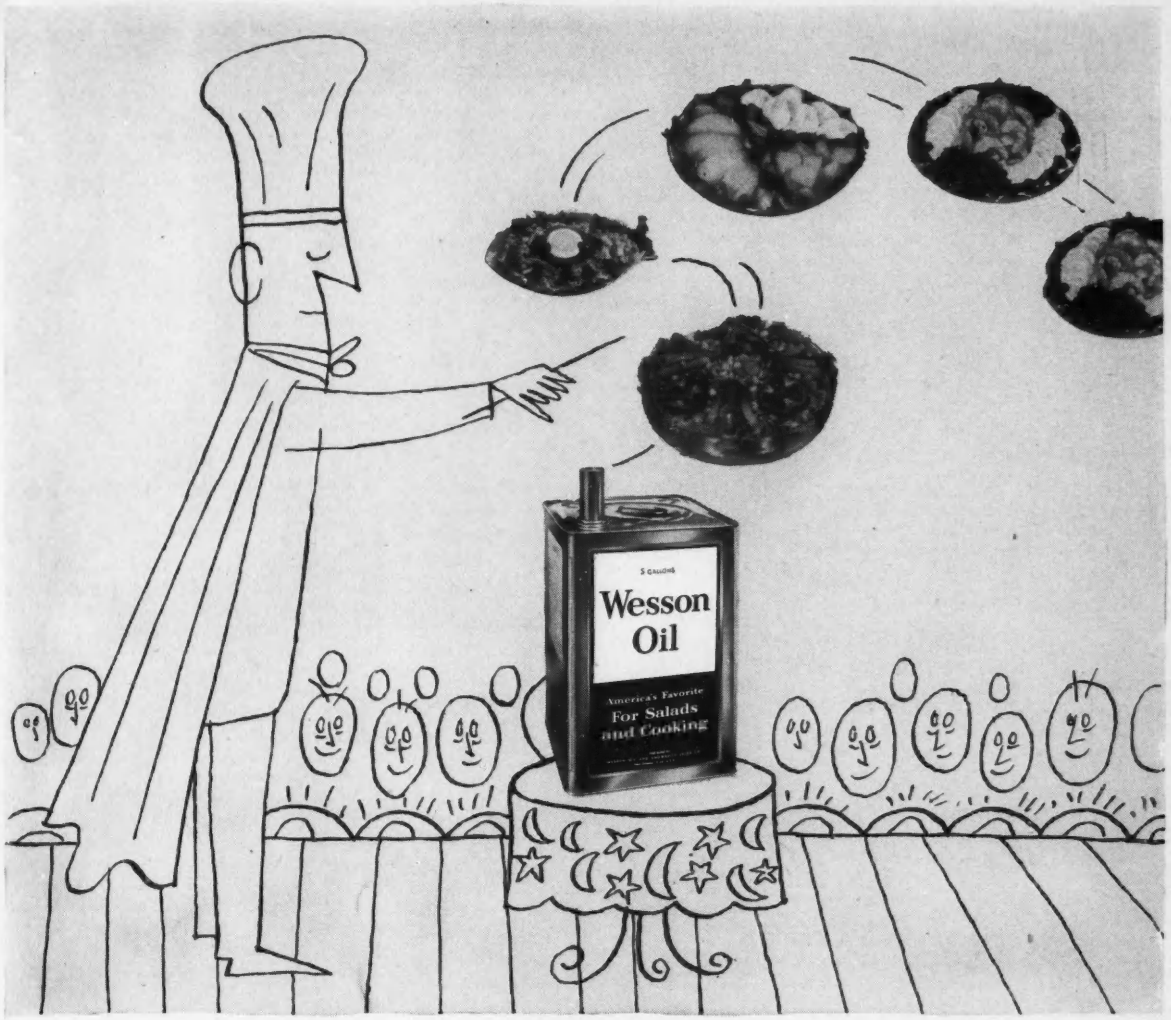
THE AMERICAN JOURNAL OF NURSING

Vol. 57, August, 1957

* When she chooses breast feeding. M. H. McClure—p. 1002.

Breast Feeding. Breast feeding can be a happy and satisfying experience for the new mother and her baby if she gets the support, encouragement, and instruction she needs in her first attempts at nursing. Putting the baby to the breast for the first time can be an awkward situation. However, the new mother's anxiety can be allayed by a relaxed attitude and skillful nursing help. The mother should be given privacy. The mother's hands and the nurse's hands should be washed. The nurse should help the mother into the position she finds most comfortable and show her how to cradle the baby's head and let him take the nipple. If the mother's nipples are flat or small, the nurse must "make" a nipple by pressing her thumb and forefinger together on the aerola. Sometimes for flat or inverted nipples, a nipple shield is used for the first few minutes of feeding. It is desirable for the mother to use both breasts for approximately 5 min. each, thus encouraging gradual nipple toughening. This also enables the baby to get the colostrum from each breast and provides extra stimulus for the "coming in" of the milk. The nurse should teach the mother how to remove the baby from the breast: the mother should put her finger directly into the baby's mouth to break the suction and free the nipple without trauma. Mothers should alternate the breast with which they begin feeding, because the baby sucks hardest when first put to breast. Mother's milk usually "comes in" between the third and fifth day after birth. Nursing periods can be increased gradually to 10 min. on the first breast. In many cases, nursing will occur almost every hour and through the night. In case of difficulties, the nurse can help the mother. Nipple lubricants should be used on sore or cracked nipples which heal more rapidly when exposed to the air. If any abscess symptoms occur, the doctor should be called.

Management of Hepatic Coma. The response to treatment in sixty-five episodes of hepatic coma was studied in sixty-three patients. Thirty-four patients were treated with protein withdrawal, oral broad-spectrum antibiotics, and enemas. Twenty-one patients improved during treatment, and thirteen recovered. Additional therapy with glutamic acid, aspartic acid, cortisone, hydrocortisone, or lipoic acid was given on forty-seven occasions. No additional benefit could be attributed to these specific agents. It is concluded that the therapy of choice was protein withdrawal



You can get $700 worth of salads out of every 5-gallon can of Wesson Oil

With oil-cost-per-salad that low, why risk using a so-called "just as good" brand? It couldn't possibly equal delicate Wesson Oil—as light and fine as an oil can be.

How to cut salad costs sensibly

Don't use a cheaper oil that coarsens the flavor of your salads. *Do* use delicate Wesson Oil . . . and carefully watch the amount of dressing used per salad.

Just enough dressing makes salads taste better. And salads made with Wesson Oil dressings taste the best of all.

Rainbow Salad

Approximate yield: 32 one-cup servings

Prepare 1 quart each: shredded carrots, cooked peas, sliced onions, shredded cabbage, chopped green pepper, sliced celery, cubed American cheese and sliced cucumber.

On individual salad plates covered with lettuce cups, arrange each item in strips or mounds. Garnish with tomato wedges. Serve with basic dressing shown on 5-gallon can of Wesson Oil. About 285 calories. For Slimming Salads of this size we recommend 3 tablespoons of dressing per serving.

Vegetable Oil is no sideline with us . . .
that's why Wesson is America's largest selling brand!

The Wesson Oil People

Makers of Heavy-Duty MFB . . . Keap . . . Quik-Blend

and oral administration of broad-spectrum antibiotics. The majority were alcoholic patients with severe liver disease, and hepatic function was the most important factor in prognosis.

Dieting Depression. About half of all obese persons who undertake more or less strenuous weight reduction regimens experience untoward symptoms. One response is described as the "dieting depression" which is likely to be unanticipated because it is preceded by a period of undue enthusiasm or elation. These findings emphasize the vulnerability of obese persons during attempts at weight reduction and suggest that reducing diets should be prescribed only after careful evaluation of a patient's life adjustment.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 189, May, 1957

* Utilisation of calories from alcohol and wines and their effects on cholesterol metabolism. A. F. Morgan, L. Brinner, C. B. Plaa, and M. M. Stone.—p. 290.

Utilization of Alcohol and Wines. The utilization of calories for growth by young rats given an adequate diet, free access to drinking water, and supplements of 15 to 20 per cent alcohol solutions or wines of the same alcohol concentrations was equal to that of rats receiving no alcohol if the alcohol calories were calculated as 75 per cent physiologically available. When no additional water was given with the alcohol and wine solutions or when water intake was restricted to the amount taken by the alcohol groups, dietary intake and growth were at once decreased about equally in the water-restricted, wine, and alcohol groups. When 1 per cent cholesterol was added to the diet, all the rats grew better than on the basal diet, and water restriction had less unfavorable effects. The liver fat of the alcohol groups was higher. Restriction of water intake by rats given alcohol solutions appears to account for most of the effects of chronic alcohol ingestion reported previously.

ANNALES MEDICINAE EXPERIMENTALIS ET BIOLOGIAE FENNIAE

Vol. 35, Supplementum 2, 1957

* Investigations on Escherichia coli O groups 1-25, 44 and 78 and sero-types 26:B6, 55:B5, 86:B7, 111:B4, 125:B15 and 126:B16. Occurrence in faeces of healthy and diarrheal infants. J. A. Grönroos.—p. 7.

Vol. 35, Supplementum 10, 1957

* Studies of serum lipids and lipoproteins in bleeding anaemia in rabbits. M. Miettinen.—p. 3.

***E. Coli* in Infant Feces.** The serologic identification of *E. coli* O groups 1–25, 44 and 78 and sero-types 26:B6, 55:B5, 86:B7, 111:B4, 125:B15, and 126:B16 and their possible occurrence in feces of healthy and diarrheal infants under two years of age has been investigated. The serologic properties of these strains have been studied, using immune sera prescribed in the diagnostic antigenic schema of *E. coli*.

Serum Lipids in Rabbits. Changes occurring with bleeding anemia in the amounts of cholesterol, phospholipids, and total lipids, in the serum and in the distribution of cholesterol and phospholipids in alpha and beta lipoprotein fractions were studied in rabbits. Bleeding caused a rise in the serum cholesterol, phospholipids, and total lipids. This rise was significant when 25–50 ml. blood was withdrawn daily. These lipids did not show a statistically significant increase when the rabbits were bled 12–15 ml. daily for two weeks. In rabbits which were bled 55–70 ml. once only, the hemoglobin did not drop as low as in the above groups and only the total lipids increased significantly. The most marked increase in the lipids, resulting in lipemic turbidity in the serum, was seen in rabbits which were bled 25–40 ml. daily. The total lipids increased relatively more than the cholesterol and phospholipids, in which the increase was approximately equal. The increase in cholesterol and phospholipids occurred usually in the beta lipoprotein fractions only.

ARCHIVES OF INTERNAL MEDICINE

Vol. 100, July 1957

* Maintenance of adrenal cortical responsiveness during prolonged corticoid therapy. I. I. Young, V. De Filippis, F. L. Meyer, and W. Q. Wolfson.—p. 1.
* The influence of the endocrine glands on fatty acid and ketone body metabolism. F. L. Engel.—p. 18.

Essential fatty acids and atherosclerosis. G. V. Mann —p. 77.

* Diabetes insipidus following head injury. H. H. Hiatt and S. Lowis.—p. 143.

Differential diagnosis and treatment in hemorrhagic disease. J. H. Lewis and P. Didisheim.—p. 157.

Adrenal Cortical Responsiveness in Cortical Therapy. Adrenal cortical atrophy and unresponsiveness are commonly observed during and shortly after prolonged administration of adrenal cortical steroids. This state renders the subject vulnerable to stress-induced acute adrenal cortical insufficiency. Combined corticotropin-corticoid therapy may be of value in preventing of this condition.

Endocrine Glands in Fatty Acid and Ketone Body Metabolism. The possible roles of the endocrine glands in fasting and insulin hypoglycemia ketosis are reviewed. Neither the adrenal medulla, the adrenal cortex, nor the hypophysis is essential to the development of ketosis during fasting or hypoglycemia. Glucocorticoids suppress the ketosis resulting from fasting, cold stress, and fluoroacetate poisoning, but not that due to insulin hypoglycemia or ketogenic pituitary extracts. Growth hormone, thyrotropin, and corticotropin possess ketogenic and adipokinetic action, the latter independent of the adrenal cortices.

Diabetes Insipidus after Head Injury. Hyperosmolarity of the extracellular fluid is a more frequently reported complication in patients with head injury than is polyuria. A rising serum sodium and chloride, mild polyuria, a dilute urine, and low urinary excretion of sodium and chloride were observed in the case presented. Improvement followed the administration of posterior pituitary hormone. It is suggested that the serum hyperosmolarity and low urinary electrolyte excretion were the result of diabetes insipidus.

CANADIAN JOURNAL OF PUBLIC HEALTH

Vol. 48, May, 1957

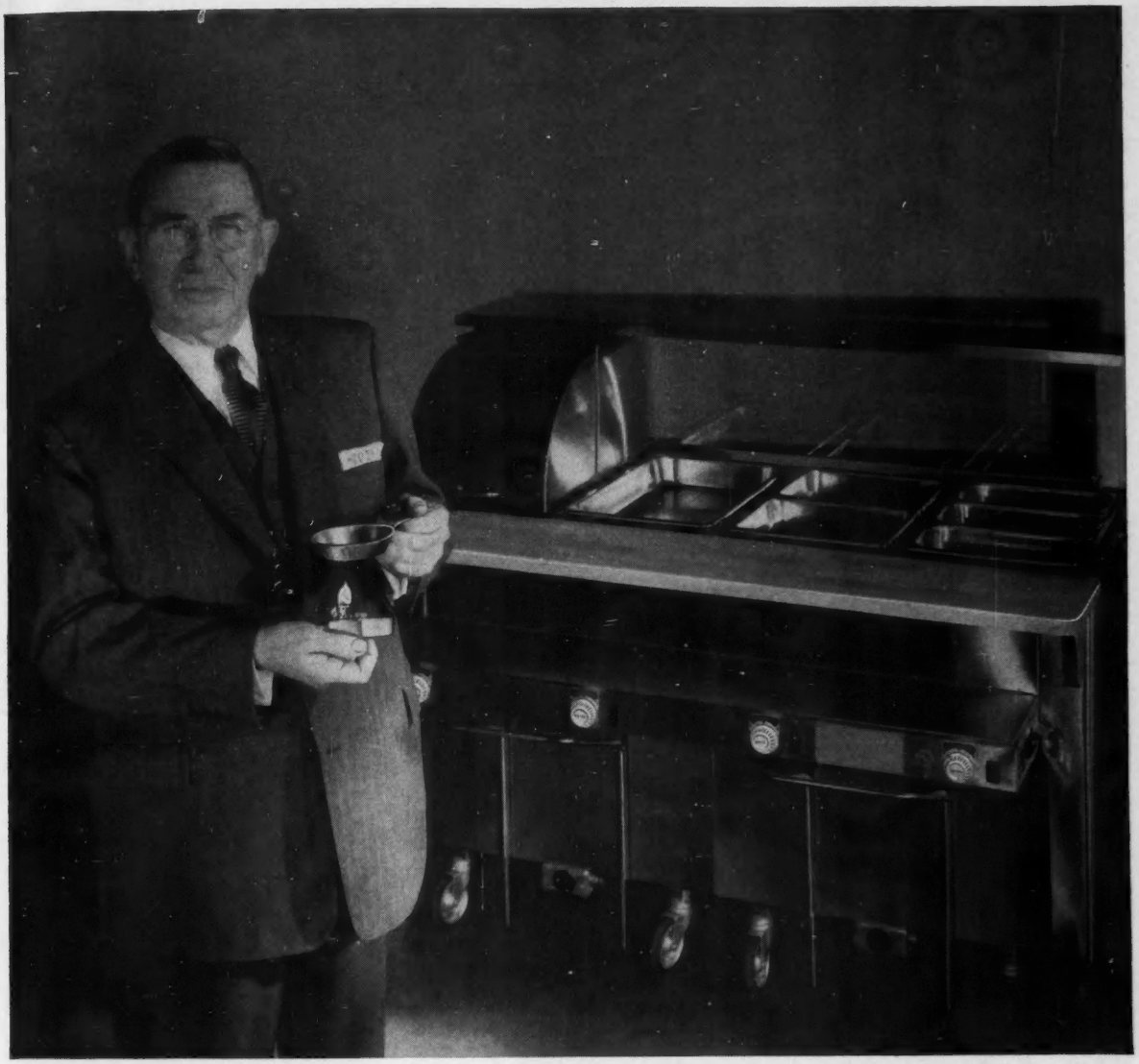
* Recent observations on type E botulism. C. E. Dolman.—p. 187.

Type E Botulism. About 100 type E strains of Clostridium botulinum have been isolated from the flesh of fish and marine mammals implicated in outbreaks of human botulism in various countries of the northern hemisphere, from soil, lake shore or sea mud in British Columbia, Japan, Denmark, and Greenland, and from normal fish intestines in Japan and France. The fickle and comparatively feeble toxigenic characteristics of even freshly isolated type E strains are in marked contrast with the unusually rapid course and the heavy fatality rate in many outbreaks of type E botulism. Roughly one-half of the 100 strains have been subjected to intensive study of their distinctive cultural, biochemical, and toxigenic properties. Toxigenic type E strains tend to become atoxic because they readily degenerate into an opaque and sporulating colonial mutant, or less often into a proteolytic mutant. These mutants, whether cultured alone or together, are incapable of toxin production; but either of them may revert to the toxigenic phase. If toxigenic and proteolytic mutants are grown in the same medium, or their filtrates are pooled, the toxic potency is markedly increased in terms of mouse lethality. Type E toxins can be "activated" by incubation for a few hours at 37°C. with 1 per cent trypsin at about pH 6.0, so that their mouse lethalities may increase up to 10,000-fold or more. Preliminary tests suggest that the antitoxin-binding power of such activated toxins is not markedly affected. The paradoxically high average fatality rate in human type E botulism has been interpreted in the light of these toxin-activating phenomena. To date, 32 outbreaks of type E botulism have been recorded, involving a total of 145 persons, with 56 deaths, a case fatality rate of 38.6 per cent. Of the 27 outbreaks which have occurred in regions bordering the North Pacific Ocean, 20 were in Japan, 4 in British Columbia, 2 in Alaska, and 1 in California. A brief account is given of previously unreported occurrences in Alaska and Labrador, both involving Eskimos, in which the incriminated foods were beluga and seal flipper, respectively.

CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 77, July 1, 1957

* The management of acute renal failure. R. A. Palmer, E. Henry, and J. Eden.—p. 11.



"I guarantee Thurmaduke Waterless Food Warmers to be as much as 70% more economical than all other food warmers"

says M. P. Duke, President, Duke Manufacturing Co.

This simple Direct Heat Test proves it's a waste of money heating water to warm food. When heat is applied directly to a warming container, as in Thurmaduke Waterless Food Warmers, as much as 70% less heat is required than in *any* water-type warmer.

Thurmaduke saves you money in many ways. Thurmaduke has more efficient Selective Heat Control for each section than any other food warmer made. Foods like mashed potatoes and soups can be stored side by side at the exact temperature best for each. Less food shrinkage and more portions per pound mean more profit for you with a Thurmaduke. Each section is fully insulated on all sides and bottom to prevent heat passage between sections and out into the room. This means Thurmaduke gives you terrific fuel savings, more accurate temperature control for perfect food storage. With Thurmaduke Waterless Food Warmers, there is no costly overload on your air conditioning as caused by all water-type warmers.

Don't buy any food warming equipment until you have made a feature comparison with Thurmaduke. I personally guarantee the complete line of Thurmaduke Food Warmers to have more quality features than any other made. *Write me for complete information on Thurmaduke Food Warmers, Standard Sectional Cafeteria Counters, and a free Feature Comparison Chart.* Meanwhile, let your nearby Thurmaduke dealer show you how the Thurmaduke pays for itself out of fuel savings alone.

M P Duke

PRESIDENT

DUKE
SETS THE STANDARD
For The Food Serving Industry

THURMADUKE

DUKE MANUFACTURING CO. • DEPT. No. 121 • ST. LOUIS 6, MO.

Acute Renal Failure. Fifty-four cases of acute renal failure have been reported, fifty-three being due to acute nephrosis, and one to acute glomerulonephritis. Approximately two-thirds were classified as ischemic nephrosis and about half of these arose as obstetrical complications. Approximately one-third of the total group were classified as nephrotoxic nephrosis, the main cause being carbon tetrachloride. In the ischemic group, hypotensive shock appeared to be an invariable feature, being directly observed or presumed from the history of onset. As an isolated factor, hemolysis was a doubtful cause of acute nephrosis. Treatment was basically conservative and consisted primarily of strict fluid balance, high caloric feeding, and electrolyte correction. In three cases, the use of ion exchange resins appeared to be effective in controlling mild or moderately severe hyperkalemia. Hemodialysis was used only when patients appeared to be deteriorating under the conservative medical regimen. It was employed for twenty-three patients, twelve of whom recovered. It appeared to be a major factor in the recovery of ten. The mortality for all cases in this series was 50 per cent and was worse in ischemic nephrosis, mainly because of the severity of associated injury or disease. In the nephrotoxic group where the "injury" was predominantly renal, the recovery rate was 62 per cent, deaths being mainly due to extra-renal causes. Because extrarenal injury will always be a serious factor in cases developing acute renal failure, it is suggested that an expected recovery rate in cases under ideal management will be approximately 65 to 70 per cent.

FOOD AND NUTRITION NOTES AND REVIEWS

Vol. 14, March and April, 1957

* A dietary survey of Tasmanian school children. J. F. Howeler.—p. 19.

Children's Diets in Tasmania. A dietary survey was taken of children in several schools in Tasmania. All diets were calculated in terms of calories, protein, calcium, iron, vitamin A, thiamine, and ascorbic acid. In general, there was a low-calcium intake and the school milk program has been of great value, since the cheese and milk consumption in the homes is low. Fresh vegetables and fruits are difficult to obtain in some areas of Tasmania. The schools with a complete lunch made a valuable contribution to the daily food intake. It is felt that nutrition education in the schools, stressing the needs for a balanced and varied diet, is necessary.

FOOD RESEARCH

Vol. 22, May–June, 1957

* Some statistical considerations in organoleptic research: triangle, paired, duo-trio tests. A. P. Radkins.—p. 259.

Vol. 22, May–June, 1957

* Nutritive value of Central American corns V. Carotene content and vitamin A activity of three Guatemalan yellow corns. R. L. Squibb, R. Bressani, and N. S. Scrimshaw.—p. 303.

Organoleptic Research. A procedure for planning or designing the statistical phases of organoleptic experiments, including the determination of sample sizes and critical regions for triangle, paired, and duo-trio tests, is presented. The use of the binomial distribution and the normal approximation to the binomial are discussed. Examples demonstrating the advantage of this procedure have been given.

Nutritive Value of Corn. In Central America, corn is used extensively in animal feeds and to a large degree for human diets in rural areas. Avitaminosis A is a major nutritional problem of both humans and animals, and estimation of vitamin A activity of feedstuffs is important. However, the vitamin A activity of corn is contributed largely by cryptoxanthin and beta-carotene, and the relative amounts of each are not constant among different corns. This emphasizes the importance of analyzing corn for both cryptoxanthin and beta-carotene.

FOOD TECHNOLOGY

Vol. 11, July, 1957

* Radiation preservation of cured meats. A. M. Erdman and B. M. Watts.—p. 349.
* The effect of alternate freezing and thawing on the total flora of frozen chicken pies. G. J. Hucker and E. R. David.—p. 354.
* The effect of alternate freezing and thawing on the total flora of frozen vegetables. G. J. Hucker and E. R. David.—p. 381.
* Time-temperature tolerance of frozen foods. VI. Retail packages of frozen strawberries. D. G. Guadagni, C. C. Nimmo, and E. F. Jansen.—p. 389.

Radiation of Cured Meats. Studies on pigment changes in non-irradiated cured meats have demonstrated that oxidation of the ferrous heme pigment to the brown ferric compound may be inhibited if the meat contains reducing compounds, such as free sulfhydryl groups or added ascorbic acid, and nitrite. Cured meats (ham and bologna) were radiated with gamma rays ranging from 2×10^5 (low dosage) to 2×10^6 (high dosage). Severe color losses, off odors, loss of free sulfhydryl group, and marked changes in nitrite occurred. The application of sodium ascorbate in the presence of excess nitrite gave color and odor protection during radiation and brief storage periods. Ground pork mixed with curing salts, sodium ascorbate, and liquid smoke, radiated and heated to destroy enzymes, retained good color and odor over six months' storage at room temperature. Similar samples radiated but not heated underwent a browning reaction during storage. Samples heated after packaging but before radiation lost color during storage, possibly because of less opportunity for enzymatic exhaustion of oxygen within the meat tissues.

Frozen Chicken Pies. A particular problem of commercial frozen products is the control of the total bacterial flora at a level which will at least partially insure a considerable margin of safety against spoilage. Alternate freezing and thawing of commercial frozen chicken pies does not increase the total flora unless the conditions of the thawed phase initiated growth. No increase in count occurred when thawing pies were held at 2°C. (35.6°F.); 7°C. (44.6°F.); and 18°C. (64.8°F.) for 48 hr. When held at 21°C. (69.8°F.) and 32°C. (89.6°F.), the first increase in total flora occurred after approximately 10 hr.

Frozen Vegetables. Alternate freezing and thawing does not increase the total bacterial count in frozen vegetables (peas, corn, string beans, spinach, and Lima beans), provided growth is not initiated in the thawing phase. Frozen vegetables held at 2°C. (35.6°F.) for 70 hr. or at 7°C. (44.6°F.) for 10 hr. showed no significant increase in total count. At 32°C. (89.6°F.), growth was initiated at 4 hr. and at 18°C. (64.4°F.) at approximately 7 hr.

Frozen Strawberries. Color and flavor changes of frozen strawberries were evaluated. Quality-control experts from freezer plants indicated that storage at 20°F. for four to six weeks resulted in deteriorative changes in color, flavor, and loss of ascorbic acid which might be serious enough to cause consumer complaints. Deteriorative changes above 0°F. vary exponentially with temperature. For each 5°F. increase, deterioration rates were increased two- to threefold. Hermetic containers were far superior to the nonhermetic type in both flavor and ascorbic acid retention. An approximation of the total quality loss or abuse may be obtained by determining ascorbic acid and its various oxidation products.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Vol. 5, July, 1957

* Effects of chlorinated hydrocarbon insecticides on flavors of vegetables. J. J. Birdsall, K. G. Weckel, and R. K. Chapman.—p. 523.
* Nutritive value of quinua proteins. F. Quiros-Perez and C. A. Elvehjem.—p. 538.

Insecticides on Vegetables. A study was made of the effects of seven chlorinated hydrocarbon insecticides (aldrin, dieldrin, endrin, chlordan, heptachlor, lindane, and toxaphene) on the flavor of twelve vegetables. The treated vegetables were evaluated in the forms in which they are commonly consumed. Triangular taste tests indicated that lindane treatments caused considerable damage to the flavor. The effects of other insecticides were less pronounced. Application of the insecticides to the soil caused a few more changes in flavor than did application to the foliage. Flavor evaluations after prolonged storage of treated raw and canned vegetables were similar to the fresh samples. Changes in flavor were more pronounced in canned samples than in raw or cooked samples.

Quinua Proteins. This study confirms reports that quinua, a Peruvian seed, has a high quality of protein and shows that plant proteins can maintain normal liver fat in association with a comparatively good growth response. Under experimental conditions, at least seven essential amino acids had to be added to quinua to produce slightly better weight gains than when 90 per

You can have a Balanced Low-Fat Breakfast!

Recently scientific and medical authorities have stated that there will probably be a trend in this country to less rich diets which means less calories in the diet. Because fats are such a concentrated source of calories, a moderate reduction of fat intake will result in a generous reduction of calories.

Medical and nutrition authorities when recommending that the fat intake of the diet be lowered state that a low-fat breakfast should provide well-balanced nourishment. *A basic cereal breakfast pattern shown below has found wide endorsement because it makes a worthwhile contribution of complete protein, essential B vitamins, and minerals to the daily diet and is low in fat.*

Basic Cereal Low-Fat Breakfast Pattern

Orange juice, fresh, ½ cup, Cereal, dry weight, 1 oz., with whole milk, ½ cup, and sugar, 1 tsp., Bread, white, 2 slices, with butter, 1 tsp., Milk, nonfat (skim), 1 cup, black coffee.

Nutritive Value of Basic Cereal Breakfast Pattern

Calories	502
Protein	20.5 gm.
Fat	11.6 gm.
Carbohydrate	80.7 gm.
Calcium	0.532 gm.
Iron	2.7 mg.
Vitamin A	600 I. U.
Thiamine	0.46 mg.
Riboflavin	0.80 mg.
Niacin	3.0 mg.
Ascorbic Acid	65.5 mg.
Cholesterol	32.9 mg.

Note: To further reduce fat and cholesterol use skim milk on cereal which reduces Fat Total to 7.0 gm. and Cholesterol Total to 16.8 mg. Preserves or honey as spread further reduces Fat and Cholesterol.

Bowes, A. deP., and Church, C. F.: Food Values of Portions Commonly Used. 8th ed. Philadelphia: A. deP. Bowes, 1956.
Cereal Institute, Inc.: The Nutritional Contribution of Breakfast Cereals. Chicago: Cereal Institute, Inc., 1956.
Hayes, O. B., and Rose, G. K.: Supplementary Food Composition Table. J. Am. Dietet. A. 33:26, 1957.

CEREAL INSTITUTE, Inc. • 135 South LaSalle Street, Chicago 3

A research and educational endeavor devoted to the betterment of national nutrition

cent quinua alone was fed. This emphasizes that 90 per cent quinua does have a good balance of amino acids. Combination of quinua and casein, giving the same total dietary protein as that supplied by quinua alone (10+ per cent), did not support better growth than quinua alone. The addition of 3 per cent casein to quinua, making up about 12 per cent protein in the diet, produced excellent growth and normal liver fat. Growth response to quinua alone is better than that to any of the other cereals.

JOURNAL OF THE AMERICAN GERIATRICS SOCIETY

Vol. 5, May, 1957

* The problem of malnutrition in the elderly. J. I. Goodman.—p. 504.

Malnutrition in the Elderly. It is felt that proper nutrition is not only important in preventing weight disturbances and specific deficiency states, but perhaps plays an even more vital role in the maintenance of normal health. A nutritional deficiency occurs when there is an inadequate intake of a sufficient amount and variety of foods. Poor food habits of the elderly can be traced to childhood food idiosyncracies. Also, habits may last longer than life itself and be passed on to the next generation. Eating habits are one of the greatest obstacles in obtaining optimal nutrition. Inadequate dentition in the elderly leads to the avoidance of foods, especially meats, which are difficult to chew and to an abundance of easily masticated carbohydrates. Anxieties and unhappiness in the elderly may lead to anorexia and may be the cause of gastritis, a common complaint. An important sociologic factor in the malnutrition of the elderly is solitude and the change of living conditions which often leads to a lack of concern about food. Another sociologic factor is limited economic status or conditions of parsimony. Chronic health conditions or poorly conceived therapeutic diets are other factors. The caloric value of the diet should be as high as possible in order to produce a positive nitrogen balance, and the diet should be high in superior protein. Adequate caloric, protein, vitamin, and mineral nutrition is much easier to achieve if fat is allowed in the diet. Fats are likely to be removed from the diet when there is digestive discomfort. In treating the elderly person, it must be certain that the patient consumes the foods prescribed. The aberrations of malnutrition almost always are reversible. Improvement in nutrition can bring a better clinical appearance, increased physical activity, improved appetite, better disposition, increased physical vigor, and a sense of well-being. Education of the public is necessary to increase the well-being of the population.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 164, July 20, 1957

* Water-borne hepatitis. Foreign Letters-Denmark.—p. 1374.
* Sodium content of beer, wine and water. Queries and Minor Notes.—p. 1422.

Vol. 164, July 27, 1957

* Estrogen residues in meat—public health aspects. G. M. Briggs.—p. 1473.
* Seasoned food for infants. Queries and Minor Notes.—p. 1521.

Vol. 164, August 3, 1957

* Trichinosis involving the central nervous system. Treatment with corticotropin (ACTH) and cortisone. L. E. Meltzer.—p. 1566.
* Aminoaciduria in relation to deficiency diseases and kidney function. H. E. Harrison and H. C. Harrison.—p. 1571.
* Shellfish in the low-cholesterol diet. Queries and Minor Notes.—p. 1630.

Vol. 164, August 10, 1957

* Current status of the treatment of gout. W. D. Robinson.—p. 1670.
* Flavonoids in human nutrition and medicine. W. N. Pearson.—p. 1675.
* Human milk proteins. Foreign Letters-India.—p. 1701.

Water-Borne Hepatitis. Of four teams of young campers, only one team escaped hepatitis. This team had a different water source than the others. The other three had a water supply from a neighboring well which belonged to a family in which one of the members was suffering from hepatitis at the time. None of the campers died, but half had to be hospitalized.

Sodium in Beer, Wine, and Water. The sodium content of beer and wine in milligrams per 100 gm. is as follows: beer, 8; dark beer, 4.3; light beer, 16; average wine, 7; port wine, 4; and sauterne, 10. The sodium content of water in a few major cities is as follows: Washington, D.C., New York City, and Portland, Oregon, less than 2 mg. per 100 gm.; Miami and Chicago, 2; Los Angeles, 5 to 17; and Houston, 16. This inquiry was directed toward patients on Kempner rice diets. However, usually no water is given to Kempner dieters. The daily fluid intake consists of 700 to 1000 cc. fruit juice.

Estrogen Residues. The use of hormones in beef cattle and poultry to improve weight gain and feed efficiency has become a widespread practice. Meat produced from these animals contains a negligible amount of estrogen activity, but this amount presents no hazard to man, since it is considerably less than that normally present in the body and much less than the therapeutic dose. The amount of estrogenic activity is no greater than that in an ordinary diet containing milk, leafy vegetables, cereals, and meat or organs from untreated animals. The only potential hazard is the possible exposure of personnel in manufacturing plants, and in the results of mistakes in mixing and feeding. These hazards can be carefully controlled, and with the continued vigilance of feed manufacturers, state feed control officials, and the Food and Drug Administration, the use of estrogen in animal production provides an important tool for improved efficiency in food production.

Seasoned Food for Infants. None of the flavoring or seasoning agents in common use, other than table salt, are apparently needed in the diet of young infants—certainly not during the early months when they seem to require and prefer puréed foods. Feeding the baby on puréed leftovers is not to be recommended as there may be vitamin deterioration and bacterial growth. When the time comes to give table foods, there is no apparent need to exclude foods which are moderately or normally spiced, since there is no evidence that such foods are harmful.

Trichinosis. Trichinosis is the most common parasitic infection in many parts of the U. S. About 18 per cent of the adult population is infected, according to the general incidence at autopsy. The disease may often be asymptomatic or the clinical features of trichinosis are infrequently diagnosed. Trichinosis commonly involves the central nervous system. Such involvement may produce either non-specific neurologic signs, such as headache, neck stiffness, and decreased deep tendon reflexes, or actual focal cerebral damage which may be of a protean type. In a case of focal cerebral damage, a dramatic, prompt improvement was noted after treatment with ACTH and cortisone. Much of the clinical picture of trichinosis suggests an antigen-antibody reaction or toxic and allergic elements. The rapid recovery with reversal of focal neurologic damage after steroid therapy may be related to these aspects.

Aminoaciduria. When plasma amino acid levels are raised so that the load presented to the renal tubules is sufficiently increased, tubular reabsorption is less complete, and increased excretion of amino acids in urine results. This overflow aminoaciduria is analogous to the glycosuria resulting from hyperglycemia. Aminoaciduria may occur with normal or even reduced concentrations of amino acids in plasma. This is renal aminoaciduria implying impairment of tubular reabsorption of amino acids, analogous with renal glycosuria. In either type, the defect may be specific for a single amino acid or a limited group of amino acids, or it may be generalized, involving essentially all of the acids. Renal aminoaciduria may result from many types of renal injury caused by inborn errors of cell metabolism, toxic agents, or vitamin deficiency states. In certain varieties of renal aminoaciduria associated with a disturbance of phosphate metabolism, amino acid excretion may be reduced or restored to normal by administration of vitamin D. New techniques for measuring individual amino acids in urine are of value in the diagnosis of specific metabolic derangements and can clarify the interrelations among disease states in which aminoaciduria is common. The losses of amino acids *per se* in the urine have not been shown to be great enough to produce amino acid deficiencies under ordinary dietary conditions.

Shellfish and Cholesterol. Shellfish, such as oysters and clams, contain a sterol other than cholesterol called "ostreasterol." The fat content of shellfish is around 1 to 2 per cent, and these foods can easily be included in a restricted fat diet. Also, at the present time, the low-cholesterol diet has little practical significance since the amount

CONTROL YOUR FOOD COSTS...

ROUND CASSEROLE

SERVE UNIFORM PORTIONS *in*

HALL
Secret Process
FIREPROOF CHINA
AVAILABLE IN 26 BEAUTIFUL COLORS

Hall Casseroles make portion control automatic. The capacity of the dish guarantees a uniform serving to each guest . . . you can determine costs and set menu prices with accuracy. Recipes served in Hall China look and taste better. . . and can be sold at better prices. Write for Bulletin SM-1.

THE HALL CHINA COMPANY • EAST LIVERPOOL, OHIO
The World's Largest Manufacturer of Fireproof Cooking China

ALSO AVAILABLE!
HALL CHINA METAL-CLAD...by PLATECRAFT.
Secret Process HALL CHINA plated with lustrous nickel-chrome by a secret process.
Write for Bulletin MC-65

OVAL FISH CASSEROLE
OVAL CASSEROLE—HANDLED
NEW YORK CASSEROLE
INDIVIDUAL STEW POT—HANDLED

H-6

★ SEE OUR EXHIBIT—SPACE 2212—NATIONAL HOTEL EXPOSITION—NEW YORK COLISEUM—NOVEMBER 12-16 ★

of cholesterol in the body is not dependent on the ingested cholesterol.

Gout. Although gout is less common than some other forms of joint disease, it is diagnosed in about 5 per cent of patients seen in clinics for arthritis and related diseases. In acute attacks, oral colchicine is generally used. Other methods are intravenous colchicine, oral phenylbutazone, and the combination of corticotropin given parenterally with maintenance doses of colchicine. The use of urate eliminants, such as probenecid, has no effect on acute attacks. Dietary measures are not effective in the acute attack. Usually a soft diet relatively high in carbohydrate is advised and liberal fluids should be taken. Salicylates or codeine may be used to control the severe pain. Treatment between attacks is directed towards decreasing the frequency of recurrent acute attacks and preventing or treating the deformities of gout by inducing negative urate balance. Oral colchicine is again generally used to prevent recurrent attacks. Dietary restriction of food containing preformed purines is helpful in obtaining a limited degree of negative balance, but urate eliminants are more effective.

Flavonoids. The recent interest in the flavonoids, particularly in the treatment of numerous clinical disorders, prompted this detailed review of various aspects of the subject. It was once reported that the major ingredient in citrin was a flavanone; hence it was felt that the flavonoids were of a vitamin nature. But, as the matter now stands, the flavonoids have no known nutritional functions. Although they possess mild pharmacologic properties under certain conditions, they cannot be regarded as essential nutrients. Recently, considerable publicity has been given to the use of flavonoids in the treatment of the common cold by virtue of their supposed capacity to increase capillary resistance. Several cold preparations containing flavonoids have actually appeared on the market. Those workers who claim therapeutic value for the flavonoids have not supported their claims with data obtained from well controlled clinical studies. Until such studies are made, it must be concluded that the flavonoids are of little or no value in the treatment of disease.

Human Milk Proteins. Malnutrition in children is widely prevalent in India, and a study of some of these children revealed either prolonged breast feeding or complete stoppage of breast feeding with a grossly insufficient intake of animal proteins. The mothers of these children also had a low-protein intake. The protein content of milk from mothers of malnourished children ranged from 0.33 to 1.33 per cent, while it was 0.52 to 1.78 per cent in control mothers. This intake of milk, poor in quality and quantity, may produce deficiency states and be a factor in infantile cirrhosis.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 226, June, 1957

* The effect of thyroxine on magnesium requirement. J. J. Vitale, D. M. Hegsted, M. Nakamura, and P. Connors.—p. 597.

Thyroxine and Magnesium Requirement. There is an increased requirement for magnesium when there is an increased production of thyroxine. Thyroxine uncouples oxidative phosphorylation *in vitro* while magnesium prevents this uncoupling effect. It was found that growth inhibition in young rats produced by the addition of thyroxine to the diet is partially overcome by extra supplements of magnesium. The amount of magnesium required is related to the amount of thyroxine added. Magnesium is not capable of completely preventing the thyroxine-induced growth depression. The capacity of the heart to carry out oxidative phosphorylation was impaired in the thyroxine-treated animals but was raised to normal by high levels of dietary magnesium.

THE JOURNAL OF THE CANADIAN DIETETIC ASSOCIATION

Vol. 19, July, 1957

* The how of low sodium diets. M. F. McInnis.—p. 18.

Low-Sodium Diets. The success of any diet depends on the patient's acceptance and the dietitian's understanding. It is the dietitian's job to make the diet nutritionally adequate, palatable, and attractive, and as similar as possible to the patient's individual food habits. The acceptance of a low-sodium diet depends to a great extent on the attention given to menu planning, recipe formulation, and attractive food service. After his return home, a patient will often base his meals on the trays he received in the hospital. Discharge diets are important to the patient after he is home, as this is probably his only source of information. The discharge diet should be in a form he can easily understand and should contain suggestions for menus, seasonings, and recipes.

JOURNAL OF CLINICAL INVESTIGATION

Vol. 36, Part I, June, 1957

* Aldosterone excretion in normal subjects depleted of sodium and potassium. B. B. Johnson, A. H. Lieberman, and P. J. Mulrow.—p. 757.
* The effects of cortisone and hydrocortisone on water diuresis and renal function in man. L. G. Raiss, W. F. McNeely, L. Saxon, and J. D. Rosenbaum.—p. 767.
* Unesterified fatty acid in human blood plasma. II. The transport function of unesterified fatty acid. R. S. Gordon.—p. 810.
* Early effects of fat ingestion on lipids and lipoproteins of serum in man. R. J. Havel.—p. 848.
* Early effects of fasting and of carbohydrate ingestion on lipids and lipoproteins of serum in man. R. J. Havel.—p. 855.

Aldosterone Output after Sodium or Potassium Depletion. In three normal men, restriction of potassium intake to 9 mEq per day was followed by a marked decrease in aldosterone output below control values. When sodium intake was also reduced to 9 mEq, aldosterone output rose to levels two to six times the original control values. This rise appeared to be delayed and to fall short of the increases previously observed on deprivation of sodium alone. Restoration of potassium to the diet while sodium restriction was maintained was followed by a slight additional increase in aldosterone excretion in one case and a moderate increase in the other subjects. The highest aldosterone output of one subject was observed before potassium replacement when 150 mEq ammonium chloride were given for two days. Insignificant changes were observed in the output of 17-ketosteroids and 17-hydroxycorticosteroids.

Cortisone and Water Diuresis. The effects of large doses of cortisone and hydrocortisone on water diuresis and renal function in man have been examined. The rate of urine flow observed during a maintained water load was regularly increased greatly during steroid administration irrespective of changes in the dietary intake and renal excretion of sodium salts. Serial studies in subjects on a salt-poor diet demonstrated an increase in maximal urine flow and in free-water clearance. The increased excretion of water was usually but not invariably accompanied by a small increase in sodium excretion, a gain in body weight, and sometimes by an increase in total solute excretion. The small rise in glomerular filtration rate during steroid administration did not parallel the increase in maximal urine flow. A single intravenous infusion of hydrocortisone regularly produced an increase in glomerular filtration rate, but without a consistent increase in the diuretic response to water loading. The observations indicate that continued administration of steroid in large doses influences the renal tubular reabsorption of water. It is suggested that more free water is made available for excretion because of a redistribution of solute reabsorption between proximal and distal systems or an alteration in the permeability of the renal tubular epithelium to water.

Transport Function of Unesterified Fatty Acid. Employing a newly developed analytical procedure for determining the concentration of unesterified fatty acid (UFA) in blood plasma, it has been possible to demonstrate in fasting human subjects arteriovenous differences indicative of a net transport of fatty acid from adipose tissue to myocardium, skeletal muscle, and viscera. The administration of glucose and insulin causes a sharp decrease in UFA concentrations and an abolition of the arteriovenous differences. Alanine, leucine, and glutamic acid administered by mouth to fasting human beings have an effect like that of glucose in reducing UFA concentrations, though the decreases are less dramatic. It is suggested that adipose tissue responds, through some mechanism sensitive to the availability of nonfat calories, by liberating more or less UFA into the blood and so maintaining a "caloric homeostasis".

Lipoproteins after Fasting. The concentrations of lipid and protein constituents of ultracentrifugally separated serum lipoprotein fractions were

Each of the six soups shown here is a complete soup that needs no preparation other than heating. They are carefully compounded to provide soups that meet the needs of patients on restricted diets.

One of our constant aims at Custom is to supply our customers with flavorful products. We know from our experience with patients who are now using these soups that they find them extremely palatable and appetizing – that these are amazingly flavorful soups.

APPROXIMATE ANALYSIS

PROTEIN	ASH	FAT (ETHER EXTRACTION)	CARBOHY-DRATES	TOTAL SOLIDS		CALORIES per 100 grams	CALORIES per 6 fl. oz. serving	SODIUM (Na) in Milligrams per 100 grams	SODIUM (Na) per 6 fl. oz. serving
0.47%	0.34%	0.02%	0.57%	1.40%	Dietetic Mushroom Broth	4.45	8.01	5.63 mg.	10.13 mg.
2.44	0.33	0.06	0.51	3.34	Dietetic Beef Style Broth	12.65	23.40	31.60	58.46
0.89	0.70	0.02	3.10	4.73	Dietetic Vegetable Broth	16.55	30.61	38.42	71.08
1.67	0.42	0.17	5.52	7.82	Dietetic Green Pea Broth	31.06	57.77	15.61	29.02
0.92	0.64	0.10	4.95	6.72	Dietetic Tomato Broth	25.00	46.50	24.74	46.02
1.34	0.38	0.03	0.26	2.01	Dietetic Chicken Broth	6.80	12.65	22.00	40.70

For samples and more complete information, call your Custom distributor, or write

Custom **FOOD PRODUCTS, INC.**
701 N. Western Ave., Dept. JA-107 Chicago 12, Ill.

studied in seven healthy adults during short periods of fasting and after ingestion of a large quantity of glucose. To minimize the effects of chylomicronemia, a 12- to 15-hr. interval of fasting preceded each period. The total lipid concentration in very low density ($S_f > 10$) lipoproteins was variable during fasting, but fell consistently after ingestion of 400 gm. glucose over a 4-hr. period. The levels 5 and 8 hr. after starting glucose feeding were significantly lower than those after comparative periods of fasting. These changes resulted from reductions in all lipid constituents of this lipoprotein fraction, but the mean percentage fall was greatest in triglycerides, less in phospholipids, and least in cholesterol. No significant changes occurred in the concentrations of lipid constituents or protein in the major low density (S_f 0–10) lipoproteins during either period. The concentrations of cholesterol and protein in high density lipoproteins did not change, but that of phospholipids rose slightly during continued fasting and fell during the period following ingestion of glucose.

Lipoproteins and Exogenous Fatty Acid Transport. The effects on serum lipids and ultracentrifugally separated lipoprotein fractions of the ingestion of fat-rich meals were studied in healthy young adults. The increment in the concentration of triglycerides in the serum following ingestion of fat was entirely the result of an increase in their concentration in very low density ($S_f > 10$) lipoproteins. The cholesterol and phospholipid concentrations in this lipoprotein fraction also increased significantly and tended to parallel the triglyceride concentration. These changes were usually maximal 4 hr. after fat ingestion. Increments in the concentration of serum cholesterol after fat ingestion were usually slight because the increment in the very low density lipoproteins represents only a small fraction of the serum value and the cholesterol concentration of the other fractions usually changes little. Serum phospholipid concentration increased significantly following fat ingestion and frequently remained elevated after the serum triglyceride concentration had returned to baseline, or even lower, levels. The increase reflected changes in both the very low density and high density lipoprotein fractions. The delayed fall was due to the persistence of the increased concentration of high density lipoprotein phospholipids after the visible lipemia had disappeared. Lesser increases in the concentration of high density lipoprotein cholesterol and protein may also occur after ingestion of fat. These findings are discussed in relation to current concepts of exogenous fat transport.

JOURNAL OF HOME ECONOMICS

Vol. 49, January, 1957

* Graduates reflect on their education. M. S. Lyle.—p. 9.
* On human relations in the dietary department. T. G. Andrews.—p. 13.
* The consultant—a developing aspect of professional practice. B. J. Black.—p. 17.

Education. Curriculum building is a continuous process and the facts about the lives alumnae have led after graduation are useful in deciding the probable experiences of today's students. The curriculum committee of the Iowa State College Division of Home Economics decided to ask graduates of the preceding twenty years questions concerning their education. Their experiences after college in professional work and in community activities, their marital status and family situation, their advanced study, and their opinion about the curriculum, past and present, were the subjects of this inquiry.

Human Relations. A psychologist is stressing the importance of human relations. Many organizations which employ what seem to be the latest and best personnel management systems find their employees will not work efficiently. Usually the feelings and attitudes of the employees have not been taken into account. The ubiquitous human demand for status and belonging is a very potent factor. A more group-centered leadership in contrast to the standard executive-centered leadership seems to fulfil this demand. To effect this requires certain basic changes in the understandings and feelings at the supervisory level. The factor of social distance is a definite barrier to good communication in a dietary department. The supervisor should be perceived as a person rather than as a power and the subordinate also as a person rather than only as a part of the machinery of the organization. In addition to social distance in a dietary department, fairly deeply ingrained feeling in men prevents their accepting orders originating with women. However, women are often made less self-conscious and less uncomfortable by warm and dependent interpersonal relations which are certainly an asset to any organization, and especially the dietary department, which is made up of highly interdependent parts. The leadership climate for both of these objectives must begin at the top.

The Consultant. There has been a steady growth of a newer use of professional people from one field as consultant to those of another. There are two main forms of consultation. The consultant may be called in from outside the organization when a special issue arises. Second, the consultant is a continuous member of the staff. Home economists and nutritionists of health and welfare services fall into the latter form. The various functions and problems of the consultant are discussed. It should be stated that the consultant has special knowledge and is sought out for information because of it. The consultant carries no authoritative power to see that the recommendation is implemented. A consultant should be secure in her knowledge of her special field, but also have recognition of its limitations. However, she should not feel apart from the team but strive to be "part of it."

THE JOURNAL OF NUTRITION

Vol. 62, July, 1957

* Biological availability of tryptophan. J. D. Gupta and C. A. Elvehjem.—p. 313.
* Millet (*Setaria Italica*): Its amino acid and niacin content and supplementary nutritive value for corn (maize). A. S. Mangay, W. N. Pearson, and W. J. Darby.—p. 377.
* The effects of different food fats on serum cholesterol concentration in man. J. T. Anderson, A. Keys, and F. Grande.—p. 421.

Availability of Tryptophan. The nutritive value of a protein depends not only on its content and balance of essential amino acids but also on the availability of the amino acids to the animal. The availability of tryptophan from beef, pork, casein, egg albumin, beef fibrin, purified soybean protein, and milk powders was determined and found to be 80 to 100 per cent in all cases, the highest being from beef. Two ways of presenting the data and calculating availability are discussed, and these methods do not differ significantly. The unavailable tryptophan in the feces was low, correlating well with the results of the other determinations.

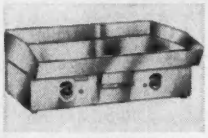
Supplementary Value of Millet. Millet is a generic term applied to any of various small cereals and forage grasses and frequently used in some countries as a general designation for sorghum, wheat, or other native cereals. Analyses of Italian millet for the essential amino acids suggested that this cereal was deficient in lysine, but of high trytophan content. Millet can correct a niacin deficiency mainly by virtue of its tryptophan content. As millet is added to a maize diet, the diet changes from one that is deficient in niacin, tryptophan, and lysine to one that is deficient in lysine alone. It is concluded that the low incidence of pellagra in maize-millet-consuming areas is due to the high tryptophan content of millet. A later report on the analysis of African and Indian millet found these varieties to be relatively rich in lysine and more limiting in tryptophan.

Food Fats and Serum Cholesterol. Though a simple reduction in the fat content of the average American diet usually produces a prompt fall in the serum cholesterol concentration, synthetic or artificial diets containing large amounts of some vegetable oils may also depress the serum cholesterol. In this present work the fats studied were: mixed fats in an average American diet both at low-fat (9 to 16 per cent of calories) and high-fat (35 to 41 per cent of calories) levels, olive oil, cottonseed oil, hydrogenated coconut oil, corn oil, sunflower seed oil, and sardine oil. The low-fat diets consistently produced a fall in the serum cholesterol concentration from the control (ordinary U. S. diet) level. Fifty gm. daily of olive oil or cottonseed oil introduced into the low-fat diets also produced a significant fall but less marked than the low-fat diet alone. Cottonseed oil at 100 gm. daily produced a slightly lower level than did olive oil at that level. The basic low-fat diet also tended to produce a lower level than 100 gm. olive oil. A much more marked depression was produced by 100 gm. corn oil. Sunflower seed oil and sardine oil produced significant depressions but, were less effective than corn oil. Coconut oil produced no significant change compared with the con-

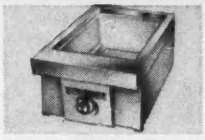
Hotpoint announces New ROCKET "Counter Kitchen"

...you get "big kitchen" capacity in counter space ...at sensational NEW LOW PRICES!

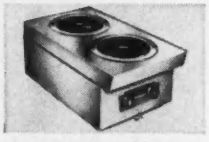
Imagine! New heavy duty ROCKET "Counter Kitchen" puts you in "big business" at lowest equipment cost per pound of cooking capacity.



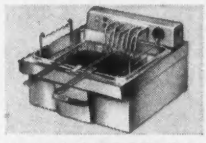
Hotpoint ROCKET 12-X Griddle—You can cook up to 720 big, 4-oz. hamburgers an hour on the "griddle that can't be killed." Giant, 36" x 18" grid area.



Hotpoint ROCKET Food Warmer—Keeps food at correct serving temperatures . . . Can actually reheat food, if necessary. Use "moist" or "dry".



Hotpoint ROCKET Hotplate—Brings 2 qts. of water to full boil in only 5.99 minutes. Exclusive Hi-Speed Calrod® Heating Units hold up to 16-qt. stockpots!



Hotpoint ROCKET 61 Frying Machine—Turns out 61 lbs. of potatoes hourly (313 servings of French-fries), raw to done, in only 28 lbs. of fat! Preheats in just 5 minutes!

NOW—for the FIRST time, and for only a fraction of what you might ordinarily expect to pay—you can handle BIG VOLUME business in just 86½ inches of counter space! Speed, quality and economical operation fully match the incomparable records set by other Hotpoint equipment . . . far exceed the best results you can hope for from ordinary counter equipment.

All four ROCKETS—ROCKET 12-X Griddle, ROCKET Hotplate, the all-new ROCKET 61 Deep-Fat Frying Machine, and the all-new ROCKET Food Warmer—are custom-matched and jacketed in gleaming stainless-steel. All are ruggedly constructed and super-powered—for years and years of hard service. Each may be bought separately, if desired; others added as you need them.

Only Hotpoint—and Hotpoint alone—makes equipment like this. Never before have you had the opportunity to get such high cooking capacity at such low cost as you are now offered in the Hotpoint ROCKET "Counter Kitchen"!

Hotpoint ALL-ELECTRIC COMMERCIAL COOKING

HOTPOINT CO., a Division of General Electric Company

MAIL COUPON for full facts ...NOW!

No obligation. Get complete details about this profit-building equipment...TODAY!

HOTPOINT CO., Commercial Equipment Dept. JAD-9
6201 W. Roosevelt Rd., Berwyn, Illinois

☐ Please send information on *Hotpoint* ROCKET "Counter Kitchen"

☐ Send representative to demonstrate ROCKET "Counter Kitchen"

Name_____

Address_____

City_____ County_____ State_____

trol diet of mixed fats. The serum cholesterol values on 100 gm. butterfat were somewhat higher than on the control diet of mixed fats. These changes in the total cholesterol concentration were accounted for by the cholesterol in the beta lipoprotein fraction. The serum cholesterol responses to the various fats corresponded roughly to the principle that saturated fats promote higher cholesterol levels than polyunsaturated fat but neigher degree of saturation (iodine value) nor content of linoleic acid fully explained the results.

THE LANCET

No. 6985, July 13, 1957

* Experimental food-poisoning by clostridium welchii. F. E. Dische and S. D. Elek.—p. 71.

Experimental Food - Poisoning. Heat-resistant type-A *Clostridium welchii* food poisoning was investigated experimentally using human volunteers. Cultures of a strain obtained originally from a food poisoning outbreak produced in most of the volunteers a short attack of diarrhea and abdominal pain after an incubation period of about 12 hr. The symptoms were identical with those in the naturally occurring outbreaks, and this is presented as evidence that heat-resistant *Cl. welchii* type A can cause food poisoning. A second strain also gave indefinite results, but a third appeared to be inactive. This suggests that virulence may be lost, which may account for the negative findings of other workers. Bacterium-free culture filtrates and cultures which had been heated to 100°C. did not produce symptoms, but positive results occurred with live cultures and suspensions. It appears probable that the illness is due to a mild transient infection. No significant rise in titre of circulating *Cl. welchii* alpha antitoxin could be demonstrated after an attack. *Cl. welchii* alpha toxin is unlikely to be concerned in the disease. Heat-resistant *Cl. welchii* spores were found in the stools of 97 per cent of the volunteers after the feeding tests; of the controls, 15.6 per cent excreted the organism. An apparent association between the hospital environment and a high carriage-rate was noted, but the explanation is obscure. An attack did not confer protection against a further attack. In circumstances where it is necessary to eat food that may contain *Cl. welchii*, infection is unlikely if it is boiled shortly before consumption.

NEW YORK STATE JOURNAL OF MEDICINE

Vol. 57, July 15, 1957

* Fat in the diet and mortality from heart disease, A methodologic note. J. Yerushalmy and H. E. Hilleboe.—p. 2343.

Dietary Fat and Mortality from Heart Disease. On the basis of an indirect study reported in 1953, it has been assumed that there is a strong association between the percentage of calories available as fat in the national diet and the death rates from arteriosclerotic and degenerative heart disease. The primary study is evaluated and indication is made of the kinds of supplementary investigation that would yield dependable results. It was found that apparent association is greatly reduced when tested on all countries for which data are available instead of the six countries used. Basic data are subject to considerable limitations. The presumed association is not "specific" for dietary fat or for diseases of the heart. For example, the association with heart disease mortality is stronger when animal protein is substituted for fat and a strong negative association is found for both animal protein and fat with mortality for non-cardiac diseases. The suggested association between death rates from heart disease and percentage of fat in the diet available for consumption cannot be accepted as valid at present.

NURSING OUTLOOK

Vol. 5, July, 1957

* On-the-job weight watching. J. L. Wolf.—p. 406.

On-the-Job Weight Watching. A weight control program in an industrial plant can serve as a nucleus around which many phases of dietary interest will revolve. In addition to advising and guiding those with problems of overweight, the industrial nurse may find that some employees are interested in increasing their weight. The first step the nurse will take in any program is to formulate an over-all plan and present it to management for approval. She may include in the plan the aims and objectives of the program, suggestions for motivating employee interest in diet plans, and ways in which the idea will benefit the company as well as the employee. Cost estimate, comparable success of such programs in other plants, and probable savings to the company as a result of the plan, may all be touched upon in the management presentation. As actual parts of the program, the nurse may wish to institute: a bulletin board campaign strengthened with frequent notices in the company's news magazine; discussions in the general plant safety committee; individual counseling of workers at the health service; individual record keeping on workers—weighing in once a week; and, a continuous distribution of helpful and informative literature for the duration of the program. The nurse will find that while engaged in a weight control program, the teaching of normal nutrition will engage much of her time.

NUTRITION REVIEWS

Vol. 15, July, 1957

* Overnutrition for the child: blessing or curse? G. B. Forbes.—p. 193.

Overnutrition for the Child. Overnutrition in infants and young children, i.e., juvenile obesity, is in many ways more of a therapeutic problem for modern pediatricians than malnutrition. Recent surveys indicate that 10 per cent of the child population can be classed as definitely overweight. The infant and child of today are bigger and grow faster than their counterparts of a half-century ago. The old maxim that a baby doubles his birth weight by five months is being lowered to three or four months. The one-year-old infant is 7 per cent taller than his nineteenth century counterpart, though the difference at birth is only 1 per cent. It cannot be concluded that maximum growth is optimal nutrition. Were yesterday's children undernourished, or are today's children overweight and overdeveloped? Data on human growth are, however, empirical. The slope of the human growth curve is not a biologic invariant. This is an area of child care in which many former deterrents to health have disappeared, and there are significant advances in food technology and the general availability of highly potent dietary supplements. Consequently, it is probable that future pediatric practice will be concerned with overnutrition.

PAPUA AND NEW GUINEA MEDICAL JOURNAL

Vol. 2, May, 1956

* Assessment and prevention of child malnutrition. H. A. P. C. Oomen.—p. 1.

Child Malnutrition in the South Pacific. In many of the tropical and sub-tropical regions of the South Pacific, child malnutrition is probably the gravest single nutritional problem. Malnutrition is regarded as a clinical entity and is primarily protein malnutrition. The toddler in the second or third year of life is the most conspicuous victim. The only diet then available to him is of the adult type. Milk from cows is not a traditional food in the islands, but in restricted circumstances, fish, shellfish, shrimps, meat, eggs, and beans can have the same function, if methods of preparation are understood. Maternal ignorance or neglect must be combated, and an effective method has been the maternal and child welfare center. However, malnutrition is not only a problem of consumption, but of production. It is essential to improve the agricultural program, to use fishery resources better, to introduce animal husbandry, and to have proper distribution and storage of foods.

PUBLIC HEALTH REPORTS

Vol. 72, July, 1957

* Human brucellosis in Indiana, 1946-50. L. O. Emik, S. R. Damon, and J. H. Scruggs.—p. 655.

Brucellosis. During the five-year period, 1946 to 1950, the Indiana Board of Health laboratory studied brucellosis within the state. Over 35,000 blood specimens were tested; 838 specimens had at least a 4+ agglutination at a dilution of 1:80; 1,998 had some reaction to the brucella antigen. Major classes of "occupation-contact" were: using raw milk, butchering or processing meat for home use, residing on farms or having farm contacts, and working in packinghouses or butchering commercially. The most commonly recorded symptom was weakness. The most prominent combination

THE HUNGRY PUBLIC

FROM DIVERSEY'S GOURMET GALLERY

THE CALORIE COUNTER

Her will power was holding up fine as she munched daintily on watercress and dry toast. Then a fudge sundae passed by and she cracked. "Just this once won't hurt," she consoles herself, and she's off on a calorie binge that makes you wonder how there could be a food surplus.

Feeding the Hungry Public is a difficult and exacting job. To build loyal, profitable business, everything must be "just so" from the degree of redness in a medium-well steak to the glistening, spotless tableware.

Maintaining high standards of cleanliness and protecting food quality is a responsibility Diversey knows well. For over 30 years, Diversey sanitation chemicals have been on the job in canneries, beverage plants, dairies and dozens of other types of food plants, protecting the products you buy. Relying on Diversey to continue the sanitation job right up to the time food is served is a natural step.

The next time your Diversey D-Man representative stops by to talk about dishwashing, cleaners and disinfectants, ask him "What's new?" You may be surprised at the number of recent advancements perfected by Diversey laboratories to give you better sanitation at far lower costs.

Meanwhile, write today for a free set of Hungry Public cartoons suitable for framing. Just send a note to the Institution Department, The Diversey Corporation, 1820 Roscoe Street, Chicago 13, Illinois.

PROTECTING QUALITY · ASSURING PURITY · DIVERSEY CHEMICALS AND SERVICES

of symptoms included: weakness, chills, night sweats, headache, and backache. There were more tests, isolations, and diagnoses in July to October, with secondary peaks in December and March–April. Large numbers of cases were found in areas with large swine populations. No sure cure for brucellosis has been discovered. Antibiotics can bring remissions, but relapse is all too common. If recorded durations of cases are reliable and representative, the prevalence of brucellosis in the U. S. in 1955 should have been over twice the incidence, and with present trends, prevalence in 1960 will exceed four times the incidence.

AMERICAN RESTAURANT MAGAZINE

Vol. 41, August, 1957

* Cold-packed facts on frozen foods.—p. 28.
* Meaty pointers on frozen cuts.—p. 33.
* Bait your menus with fish. C. E. Blackburne.—p. 71.
* Trout makes a menu.—p. 78.

Cold-Packed Facts on Frozen Foods. Thirty-one per cent of vegetables purchased by 462 surveyed restaurants were frozen. Of fruits purchased, the survey revealed one-third were frozen. Restaurants also purchase 71 per cent of their orange juice in the frozen state. No figures were given for meats, fish, or poultry, but it is well known that these commodities are now supplied in much greater quantities to buyers. The advantages of using frozen foods are well known: savings in time and labor, fresh flavor of the foods, and their availability the year round. And, because they fit well into portion control systems, making cost control an accurate reality, they have become more in demand. In buying frozen foods, purchasing facts such as the following should be considered: 2 to 3 oz. boned meat, poultry, or fish make an average serving: 75 to 85 lb. roasting or stewing chicken serve 100 persons; 50 to 75 lb. turkey will serve 100; 10 2½-lb. packages frozen fruits will yield 100 servings; 8 2½-lb. packages of frozen vegetables serve 100; and, 4 27-oz. cans frozen orange juice will serve 100. More frozen foods are being cooked from solid state than previously. When cooking vegetables in the frozen state, use only the smallest amount of water. A short cooking period, one-half to one-third the time normally required for raw vegetables, is recommended. When using the pressure cooker method, accurate timing becomes very important; vegetables cooked this way should be kept at room temperature for an hour to allow partial defrosting before cooking is started. Four hr. at 40°F. suffice to defrost a 2½-lb. frozen package. At room temperature, the same package will defrost in 1 hr. Large roasts, such as turkey or beef, require three to four days defrosting time at refrigerator temperatures. Once a frozen food is defrosted, it should never be refrozen.

Meaty Pointers on Frozen Cuts. Costs of frozen meats vary according to localities and are generally higher, pound for pound, than fresh meat. The basic principle of frozen meat cookery is to cook slowly. Prepared meat dishes should be cooked from the frozen state; other meats may be cooked while hard-frozen, partially thawed, or completely defrosted. Hard-frozen roasts require one-third to one-half again as much cooking time per pound as corresponding fresh roasts. Roasts should be placed on a rack in a 325° oven. No water should be added; the pan should remain uncovered. Thin cut, hard-frozen steaks require little more broiling time than the same cuts of fresh meat. Thicker cuts require one and a quarter to two times as much broiling time. Place steaks at least 4 in. below the source of the heat, so that the exterior surface does not overcook. Use normal broiling temperature—550°F. Pan-broiled thin steaks cook in about the same time as the same cut of fresh meat. Apply here the same rule for broiling thicker steaks when pan-frying heavier cuts. Braising and cooking frozen meats in water require about the same amount of time as is used in cooking fresh cuts. When thawing, follow directions on the package.

Fish. Fat fish should always be baked or broiled and served with a non-fatty sauce such as tomato. Lean fish should be fried or sautéd and accompanied by a tart sauce, such as tartar or Remoulade. It is wise to buy frozen fish since fish are always highly perishable, and unless the buyer has access to local varieties, frozen fish are safest. In buying, demand firm solid flesh. Watch for slimy gills—an indication of spoilage—and for strong odors. In serving halibut, estimate the number of pounds needed and order one halibut that size. Or, you can buy ready-cut halibut steaks. If fillets of sole are difficult to obtain, gray sole flounder, lemon sole flounder, and single whiting fillets will be found suitable for most needs. When ordering flounder, get large fillets; portioning cuts is easier and less wasteful. Buy ocean perch in 2-oz. fillets for portioning convenience. Buy 4-oz. fillets of ocean pike in the frozen state; this fish is highly perishable. Jack salmon is also highly perishable. Buy it in the frozen state, specifying the 4-oz. fillet. Oysters should be solidly packed on purchase. If they move freely about in their juice, they have been watered. Watch for milky juice clouds and bubbles on the surface of the juice—signs that the oysters are spoiled.

Trout Makes a Menu. Trout are available either fresh or frozen. A trout of the finest quality has no odor before or during cooking. A quality trout, when thawed, should appear the same as a fresh trout; the eyes and head are small, and there is no bright red color down the side. The trout should be heavy just in front of the tail. Its back should be dark, and its sides a light silver; its flesh should be white, and its eyes must be bright and not sunken. Fresh trout should be used quickly. Frozen trout should not be held long in storage—the longest, six months when vacuum-packed in plastics. Rainbow trout can be purchased through wholesale distributors or directly from hatcheries. They may be served baked, deep fried, pan fried, broiled, and grilled. Trout should either be boned before serving, or when served, boned by the waiter unless the patron wishes to bone his own fish.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 23, August, 1957

* Suggestions for adding interest to meals. P. Fairbrook.—p. 39.

Adding Interest to Student Meals. The experience of one college food service manager points up the importance of good communications between students and the food service staff. In this particular case, the suggestions of a student food committee were adopted with the result that good-will drowned out old complaints. The suggestions which turned the trick were: Give students a choice of ice cream at every lunch and dinner. Serve milkshakes for lunch. Keep peanut butter and jelly on condiment tables during the noon hour. Provide assorted cheeses with meatless entrées during Lent. Try serving such specialties as "chicken in the basket," snowballs, and ice cream pie. Use an electric griddle on the serving line to provide made-to-order eggs for breakfasts. Give students the choice of sweet rolls or eggs for breakfast. On special occasions, provide hors d'oeuvres or punch in the lounge or lobby before dinner. Students were delighted with the installation of high fidelity sets and loudspeakers in dining rooms. Morale shot up when prints of well known artists were hung on the once gloomy walls.

HOSPITAL MANAGEMENT

Vol. 84, August, 1957

* Food service management. A. E. Showalter.—p. 94.
* Purchasing meat.—p. 113.

Food Service Management. If the goal of the dietitian is to be a good and effective member of the hospital team, and the goal of the industrial food service is to manage efficiently the food service, not only for the hospital's financial good but for its own financial gain, then hospitals are in a position to make a choice and allow, correspondingly, the dietary department to swing a certain way. If financial management alone is the paramount goal, then an industrial food service would have much to offer; but if all three responsibilities of the dietitian—administrative, therapeutic, and educational—are stressed, it would seem that an adequately staffed dietary department with an experienced administrative dietitian would be the best solution. The author says that dietitians are weak in administrative skills, and that when they strengthen these talents they will present a superior choice over the food service company.

Purchasing Meat. To buy meat properly the purchaser must have and use a scale; know meats; set up speci-

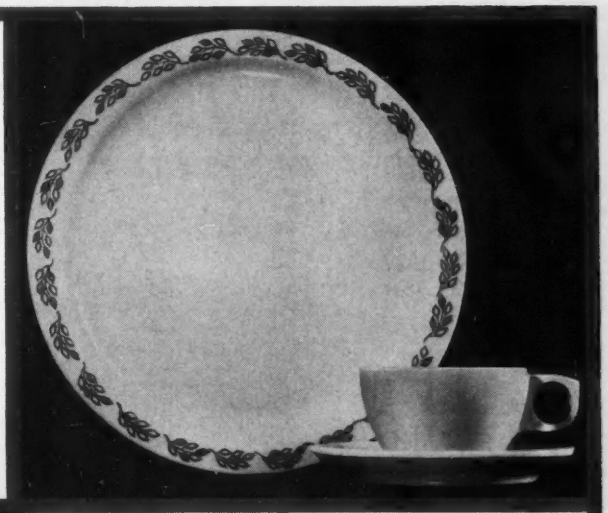
Excitingly New...by

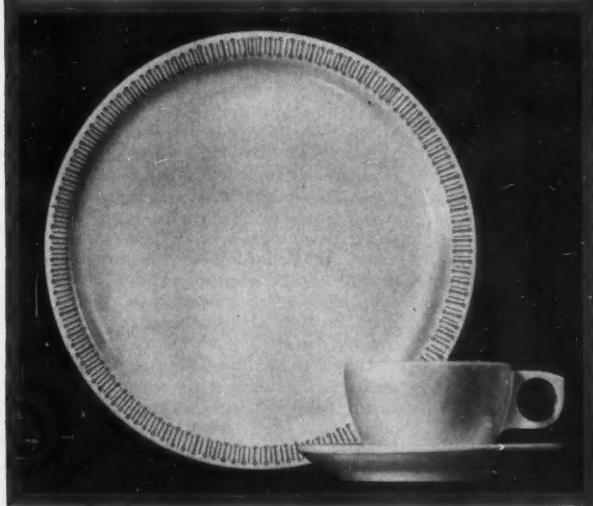
ARROWHEAD

2 Beautiful Narrow Rim Stock Patterns molded of virtually breakproof melamine to save you up to 80% in breakage.

"AMBASSADOR"

Graceful green leaves with touches of red, blue and yellow edge the rim. The background is off-white, the color of fine china. Better than china is melamine's performance. It's break-resistant, safe in dishwashers, with molded-in permanent colors.





"MILITAIRE"

The trim precision of this neat border motif is elegant and dignified. Red and blue lines alternate on a soft rose beige background. Here is smart design combined with greatest economy. Molded of melamine, with colors that can't fade, peel or chip.

Made by the makers of

BROOKPARK

the aristocrat of MELMAC® dinnerware

ARROWHEAD

A division of

international molded plastics, inc.

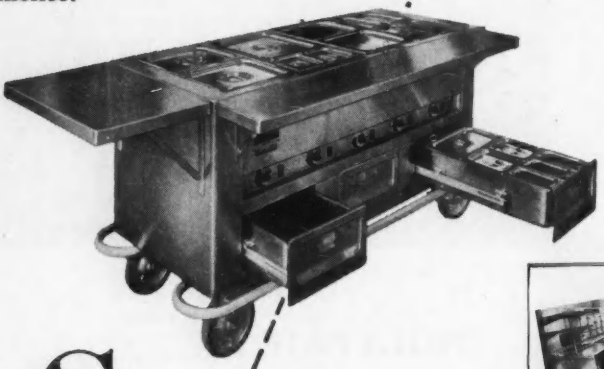
cleveland 9, ohio

FIRST STOP....

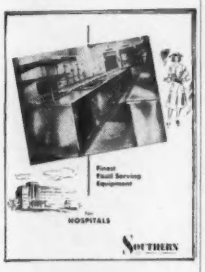
Make the Southern booth your first stop at the 40th Annual Meeting of the American Dietetic Association! We will be there specifically to serve *you*. On display—the latest and finest in food serving equipment. Of particular interest, the new Southern Bulk Food Conveyor.

Bring along your problems. They will receive prompt, courteous, expert attention. "Custom-Bilt by Southern" Dealers and other personnel on duty, specialists in planning and equipping of food service facilities, will gladly work with you right at the convention—or, if you prefer, at your call and convenience.

FEATURING
NEW
BULK FOOD
CONVEYOR



SOUTHERN
EQUIPMENT COMPANY

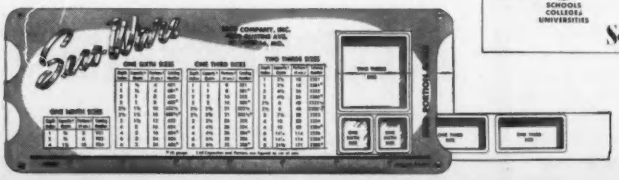


FREE!

Guides to Better Food Service. 80 pages of pictures, layouts and data on actual installations planned, engineered, fabricated and installed by Southern Equipment Company and "Custom-Bilt by Southern" Dealers.

New Seco Portion Scale. The easy way to plan hot food storage by *portions*.

P. S.—If you don't want to carry these, say the word and we will mail them to you.



SOUTHERN EQUIPMENT CO. • 4550 GUSTINE • ST. LOUIS 16, MO.

fications on cuts purchased; hire a competent and honest receiving clerk; and, get two reputable dealers to quote prices. The buyer should take time to visit the meat plant and learn what specifications mean, and hence to what products quoted prices apply. Knowledge of grades and exact cuts is important. Sex and age of the animal are two other factors which should be understood as they influence price. And remember, the quoted price of a product means nothing unless the quotations from different dealers are for comparable products. The reputation of the dealer becomes most important in the purchasing of fabricated meat. Use quotation sheets, advance menu sheets, and various other aids in purchasing fabricated meats. To aid further in buying, try to keep up with the markets in meat—take advantage of market conditions and work seasonal meats into your menus. The writer feels that one of the best ways to control purchases exactly is to buy portion control meats; with them, you achieve cost control, inventory control, and quality control while saving the chef the wear-and-tear of butchering.

HOSPITALS

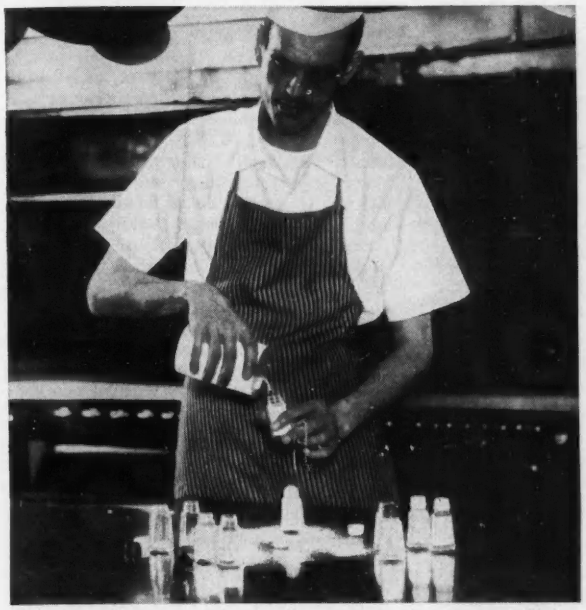
Vol. 31, July 16, 1957

* Who should direct the dietary service? Hospital's own dietitian. D. D. Kramer.—p. 76.
* Who should direct the dietary service? Outside food service management company. B. R. Judson.—p. 77.

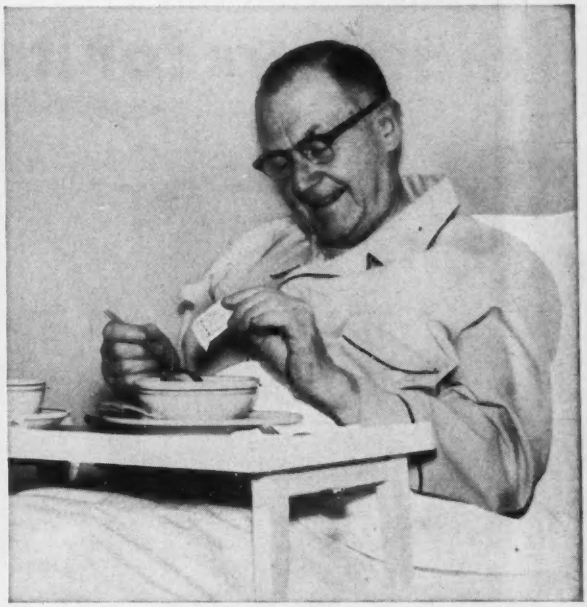
In Favor of Staff Management. Administrators facing problems in the dietary department should take a critical look at the food service operation for its good points and its deficiencies. The author believes that if administrators and directors of food service follow a planned course of action and follow through on their recommendations, they will be able to insure economical and efficient dietary operations in their hospitals without the assistance of an outside food service management company. Advantages in brief: better management, additional funds for departmental improvements, group purchasing for all supplies, stronger employee loyalty, good control of costs, control of personnel, decisions made on location.

In Favor of Food Service Management. The complexity of the dietitian's job and the improbability of adequately staffing her position in the complex, modern hospital have prompted many to turn to specialists in the management of food services, who take over the administrative functions of the dietitian. As a result, it is maintained that many benefits follow the complete reorganization and up-dating of a department. Among them: introduction of selective, cycle menus; more adequate instruction to patients; better food for patients; better trained dietary employees; structural defects minimized; better employees at little additional expense; no increase in raw food costs; more use of pre-prepared items; and better portion control. An increase in

How Diamond Crystal seasoning packets end danger of cross-infection from dispensers



Old-type salt, pepper and sugar dispensers are often sources of infection. Require constant washing, sterilizing and servicing. Require storage space for both themselves and bulk seasonings.



Diamond Crystal packets are individual seasoning containers. They are disposable and sanitary. Need no servicing. And your patients appreciate their modern convenience.

Exclusive Diamond Crystal salt, pepper and sugar packets are hygienic. Save you money on labor and dispenser replacement

Old-fashioned seasoning dispensers can be an expensive problem to hospitals. They get dirty quickly. Shakers and bowls need constant cleaning. Re-filling. Sterilizing.

Considering the price of labor today, servicing several thousand shakers can really run up your operating costs.

Packets solve problem

Diamond Crystal seasoning packets are disposable. Hygienic. Eliminate dangers of cross-infection from dispensers.

Each packet contains a generous serving of either pure Diamond Crystal salt; spicy ground black pepper; or fine granulated sugar. When the patient finishes his meal, the packets are thrown away.

There is never the danger of broken glass dispensers when you serve packets.

Exclusive "shaker" action

Only Diamond Crystal packets let you *shake on* seasoning. Their sturdy fluted paper construction allows the same *method* of application as old-type dispensers—without the costly need of regular washing, filling and sterilizing. Your saving on dispenser servicing alone more than makes up for the slight additional cost of packets.

Exclusive "Shaker action" of Diamond Crystal packets allows controlled application of seasoning.

Send for free samples

See for yourself how Diamond Crystal packets can save you time and money. Just mail the coupon below. You will receive a free sample box of 100 Diamond Crystal salt, pepper and sugar packets for your own use by return mail.

Mail this coupon for free samples

Dept. JA
Diamond Crystal Salt Co.
St. Clair, Michigan

Please send me a free sample box of your seasoning packets.

Name_____

Position_____

Hospital_____

Address_____

City_____ **State**_____

Sanitation
that Pays for itself

fmc **JET DISPOSER**

The modern space and labor saving way to dispose of kitchen food waste. The JET easily handles bones, corn cobs, celery, milk cartons, paper napkins . . . even rags and string. Exclusive principle of design breaks, pulverizes, liquefies all food waste. Power requirements and maintenance costs reduced to a minimum. Write for data and testimonial brochure.

Also Manufacturers of the Cost-Saving FMC TeaMaker and FMC Utensil Washer

Kitchen Equipment Department
FOOD MACHINERY AND CHEMICAL CORPORATION
Automation equipment for kitchens
General Sales Offices: P. O. Box 1120 San Jose 8, California · 6 N. Michigan Chicago 2, Illinois · 103 E. Maple Street Hoopeston, Illinois

total food cost may actually result from the up-grading of food served.

HOTEL MONTHLY

Vol. 65, August, 1957

* Add variety by offering more seafood dishes.—p. 47.

Variety with Seafood Dishes. Advertising and the frozen foods industry have helped to increase substantially the sales of a greater variety of fish and fish dishes to the dining-out public. Skilled chefs and catering managers are applying their specialized talents to create dishes that put salability into the menus. Many seafood items are also being utilized in the coffee shop. Here, fish sticks make a tasty, quick-to-cook, tender, and easy-to-eat featured item. Halibut is being served much more often in dining rooms where patrons may have their choice of breaded or stuffed steaks or filets. Broiled halibut makes an excellent main dish when it is marinated in olive oil and sprinkled with salt and bread crumbs. Improved transportation facilities now enable inland cities to serve lobster all year long. Lobster Newburg and broiled lobster make good menu fare, and, with them, lobster stew can help to make the name of any restaurant.

INPLANT FOOD MANAGEMENT

Vol. 4, July, 1957

* Planning your storeroom facilities. R. E. Wood.—p. 47.

Vol. 4, August, 1957

* The "U" in success. E. Thompson.—p. 50.
* Plan safety as part of the cafeteria. H. Zibble.—p. 54.

Planning Storeroom Facilities. The most important consideration in planning commercial storeroom facilities is the amount of space available. Other things to consider are the number of meals to be served, the proximity of the markets, the frequency of deliveries, the purchasing policy, and the potential future growth. It is always more economical to have too much space to begin an operation than to enlarge later. In general, the storeroom is used for the storage of cereal foods, canned goods, linen, paper goods, extra china and trays, and various non-perishable foods. It is recommended that metal equipment should be used and provisions made to keep all equipment at least 1 ft. off the floor. A well studied plan should be made to set up the location and arrangement of all material in the storeroom. Supplies should be stored in accordance with their use: items frequently used should be stored near the front. A continuous record should be maintained by posting the original quantity to a record and showing withdrawals as they are made. Responsibility for the receiving, stocking, and passing out of supplies should be delegated to one employee. To facilitate the handling of records, the inventory and the requisition to the buyer should be set up in the same sequence as the items are arranged in the storeroom. Select refrigeration to suit your needs

The final impression of quality service is made with the right cup of coffee

CHASE & SANBORN coffees are selected from the choicest crops, carefully blended and roasted especially for hotels and restaurants. You can rely on the never-changing high quality of Chase & Sanborn Coffees to produce the same full-bodied, flavorful coffee—cup after cup . . . bag after bag.

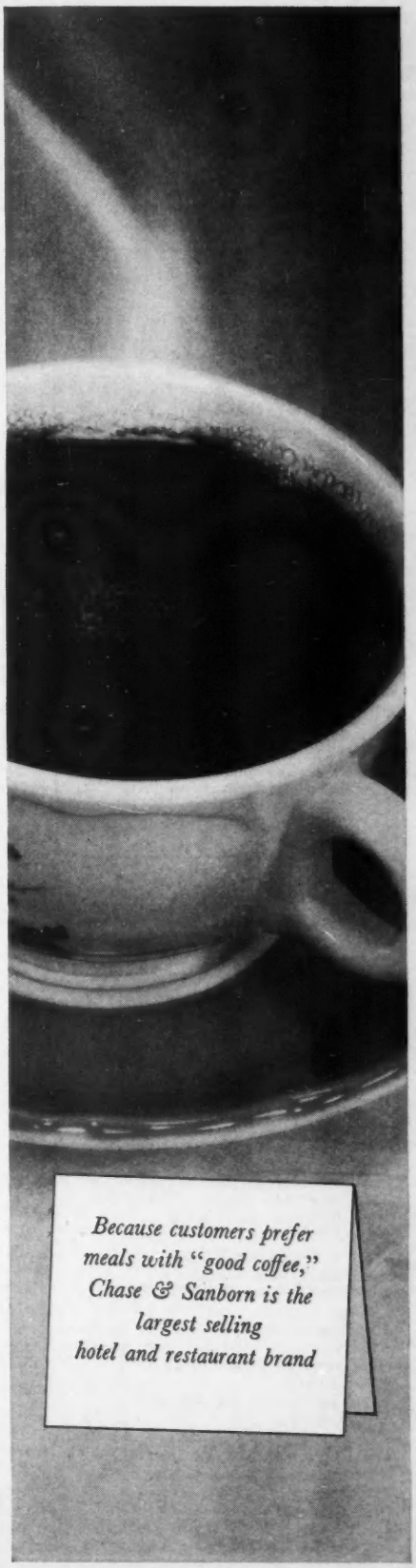
Quick Quote from Sidney Hodemaker, owner of six Hody's Restaurants, Los Angeles, California, who says, "Since the opening of our first restaurant eight years ago, a day never passes without our receiving scores of compliments on the consistently high quality of our Chase & Sanborn Coffee."

Call on Experience. You can profit from the coffee experience supporting your Chase & Sanborn man. Get in touch with him today. He'll help you serve coffee at its best . . .

CHASE & SANBORN

. . . family of fine coffees

THE ROASTERS OF FANCY MARK



Watch for Chase & Sanborn's "SHE DESERVES TO EAT OUT—at Least Once a Week" advertising campaign in Time, Newsweek, The New Yorker, Holiday and Reader's Digest.

LIPPINCOTT Current Best-Sellers on

Nutrition

Basic Nutrition

McHenry. A foundation text of essential information on all phases of nutrition, energy requirements, composition of foods, vitamins, special diets. 389 Pages, Illustrated. NEW, 1957 $5.00

Practical Nutrition

Peyton. New nutritional guide for the practical nurse. Normal nutrition, pre-natal to old age; diet therapy, nutritive values, preparation, food economics. 379 Pages, 41 Figures. NEW, 1957 $3.60

Teaching Nutrition in Nursing

Rynbergen. Suggests content of the course, lesson plans, assignments, visual aids, questions and lab. work. Adaptable to "Nutrition in Health and Disease" or any nutrition course. 142 Pages, 4th Edition, 1956 $2.75

Nutrition in Health and Disease

Cooper, Barber, Mitchell, Rynbergen. The concept of nutrition and the changes needed to provide essential nutrients in diets of the sick and convalescent. 790 Pages, 130 Figures. 12th Edition, 1953 $5.25

Breads, White & Brown

McCance & Widdowson. Describes their economic significance, their place in history, and surveys experiments made to compare nutritional values of various breads. 174 Pages. 1st Edition, 1956 $5.00

Large Quantity Recipes

Terrell. Selected and tested under sponsorship of American Dietetic Association. Standardized as to portions, volume, weight. Selected for desirability, typical production facilities, normal budgets, etc. 414 Pages, Illustrated. 2nd Edition, 1951 $7.00

J. B. Lippincott Company,

East Washington Square, Philadelphia 5, Pa.
In Canada—4905 Western Avenue, Montreal 6, P. Q.

Please enter my order and send me:
☐ Basic Nutrition $5.00
☐ Practical Nutrition $3.60
☐ Teaching Nutrition in Nursing $2.75
☐ Nutrition in Health and Disease $5.25
☐ Breads, White & Brown. $5.00
☐ Large Quantity Recipes. $7.00
Name _____
Address _____
City _____ Zone ____ State ____
☐ Charge ☐ Payment Enclosed
☐ Convenient Monthly Payments
JADA-10-57

and locate equipment, as in dry storage, near the receiving and working areas. Select equipment that is of good or excellent quality; you will save money in the long run.

Success. The author states that our ability to climb to success depends for the most part on how well we get along with people. Ten characteristics of a person equipped to meet and live competently with others are listed. These characteristics may be considered the prime ingredients of success: cheerfulness, respect for individuals, sincerity, consistency, reliability, character, courage, balance, adaptability, and charity.

Safety. Two factors are involved in accidents—the physical surroundings and the actions of the casualty. The actions of employees cannot altogether be controlled, but workers can be taught how to handle dangerous equipment or potientially dangerous situations. Fatigue, mother of thousands of accidents, can be curtailed by such factors as proper ventilation, good lighting, and clean surroundings. Methods of cutting down accidents include: formation of a safety committee staffed by a director, with a monitor in each danger area; employee meetings for general discussion of past accidents and future prevention; a new employee orientation program; first aid lessons for all kitchen employees; and a safety incentive award. A good safety campaign has dollars-and-cents value to management, and the employee team that pulls together on accident prevention will pull together on other projects.

INSTITUTIONAL FEEDING AND HOUSING

Vol. 9, August, 1957

- We keep it clean . . . and keep it longer. N. B. Laidlaw.—p. 10.
- Bread makes the difference.—p. 26.
- How to cook and serve vegetables more profitably. E. C. Blair.—p. 30.
- How to freeze and store baked goods.—p. 41.
- How to plan new feeding facilities.—p. 50.

Keeping Equipment Clean. Soil left to accumulate on food preparation and serving equipment affects the quality of the food served and also the efficient life of the equipment. Soil residue on equipment results from the use of the wrong cleaning compound, improperly balanced detergent solution, hard water, and improper cleaning methods. All soil to be removed can be classified as either organic or inorganic. Organic soil can be dissolved or neutralized by an alkaline detergent. Inorganic or "mineral" soil deposits are treated with an acid-type detergent. After selecting the detergent, apply it in the concentration recommended to dissolve or neutralize the soil; then apply friction until dirt is loosened. Rinse and sanitize after completing the cleaning. To improve cleaning procedures, get individual guide sheets from manufacturers describing the cleaning technique for each piece of equipment. Use the ultra violet light in supervision and sanitation training. Train workers in each cleaning step. Use germicidal detergents to control odors, and if you run into difficult problems, call in your sanitation consultant.

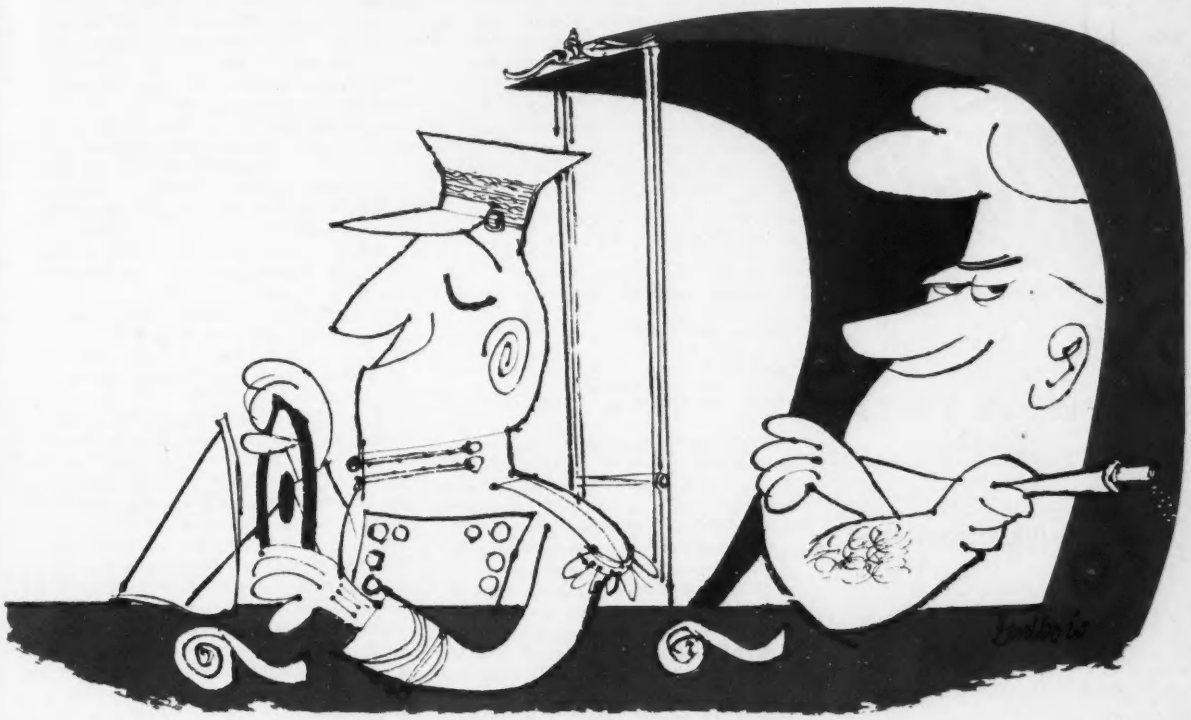
Bread. Here are a hundred and one suggestions for unique uses of unique breads to boost sandwich sales. Included are: hot sliced turkey on sage bread; hot baked sugar cured ham on raisin bread; Swiss cheese on plain, sour, or caraway rye bread, limpa, or pumpernickle; cottage cheese and grated carrot on prune wholewheat. In purchasing sliced bread for sandwiches, remember that the thickness of the slices and the number of slices per loaf will vary a little according to the individual bakery. Best storage for bread is at room temperature, 75°F. to 85°F., in a clean, dry ventilated storage unit. Temperature over 80°F. and excessive humidity increase danger of mold growth.

Cooking Vegetables for Profit. Successful vegetable cookery depends on a few basic points. Regardless of the cooking method to be used, always choose quality vegetables. Wash them thoroughly and cut them in neat, uniform pieces for best appearance and even cooking. Don't soak peeled vegetables and keep prepared raw vegetables in plastic bags, refrigerated. Never use soda in preparation. Cook in small batches; don't overcook; and cook quickly. Don't defrost frozen vegetables before cooking, but you may cut blocks of spinach or similar vegetables into smaller pieces before adding to boiling water. Drain canned vegetables and simmer in boiling liquid. Don't hold canned vegetables on steam tables for long periods; serve from shallow, small containers to prevent breaking and loss of appearance in handling. Vary the seasoning of vegetables with spices, herbs, and sauces.

Freezing and Storing Baked Goods. Cakes have more tolerance to freezing than bread. They don't have to be frozen as fast or as soon after baking. Cakes require lower temperatures than bread—freezing point for cakes is between 3° and 8°F. Commercial practice is to store them at 5° to 15°F., which is safe up to a week. If there's any doubt about maintaining humidity, it's probably best to ice or wrap cakes. Texture and flavor of cakes are not affected by freezing. Icings have an insulating effect. Iced cakes take longer to freeze and also to defrost. Cake size also is important in determining freezing and defrosting time. Eight-in. layer cakes with icing require 15 per cent longer to freeze at −20°F. than 7-in. cakes and 20 per cent longer to defrost. Unbaked bread does not keep as long as baked bread, in frozen storage. Cookies of all types may be frozen baked or unbaked; pies are best frozen before baking.

Planning New Feeding Facilities. The menu determines the expenditures to be made on new feeding facilities as well as the production to be expected from equipment and the number and types of employees. When finished floor plans are developed showing the orderly movement of food from receiving dock to serving area, type of food to be prepared and degree of service, the selection

It's simply wicked...



the way Pillsbury H&R Baking Mixes save you time and money

Live a little... try these mixes

CAKE MIXES
Chocolate Cake Mix
White Cake Mix
Lemon Gold Cake Mix
Yellow Cake Mix
Orange Cake Mix
Spice Cake Mix
Caramel Cake Mix
Angel Food Cake Mix
Gingerbread Mix
Brownie Mix

PANCAKE MIXES
Deluxe Griddle Mix
Buttermilk Pancake Mix
Waffle Mix

HOT BREAD MIXES
Plain Muffin Mix
Bran Muffin Mix
Corn Muffin Mix
Southern Corn Bread Mix
Hot Roll Mix
Deluxe Dinner Roll Mix
Biscuit Mix

SPECIALTY MIXES
Pie Crust Mix
Cake Donut Mix
Coffee Cake Mix
Breader Mix
Batter Mix
Fluffy White Frosting Mix
Creamy Fudge Frosting Mix

Available in 6/5# bales and 50# bags

XXXX Pillsbury BEST Mixes Hotel and Restaurant

BEWARE of those fiendishly clever Pillsbury H&R Baking Mixes. Once you have some, you're trapped. You cut ingredient waste and inventory so much you get that horrible thrifty feeling. You save so much preparation time you can't help but accomplish more. Figuring portion costs becomes so easy the job is positively boring. Worse yet, you produce such superior baked food—in such endless varieties—that you receive all kinds of compliments. And you? You might end up becoming hopelessly efficient and enjoy a good life.

MAIL COUPON—GET THE TEMPTING FACTS

PILLSBURY MILLS, INC.
Institutional Products, Dept. JAD-107
Minneapolis 2, Minn.

Go ahead and send your information. However, remember that I am a fine person of noble character. It's just that I have a scholarly curiosity about wicked things like saving time and money.

*Name*_____

*Establishment*_____

*Street Address*_____

*City*_____ *Zone*____ *State*_____

*I'm particularly interested in*_____ *products.*

FOR OVER 100 YEARS—
and still going STRONG.

Jullicum
REG. U.S. PAT. OFF.
since 1857

THE RENNET ENZYME DOES IT!

MAKES MILK DIGESTIBLE

TRUE FRUIT FLAVORS made from fresh fruits give JULLICUM desserts that appetizing appeal

OVERCOMES

INTOLERANCE TO MILK

THE RENNET ENZYME DOES IT!

ECONOMICAL TOO!

Write to:

SAM'L B. KIRK
5717 Christian Street
Philadelphia 43, Pa.

★

USED BY
LEADING INSTITUTIONS
ALL OVER AMERICA!

of equipment takes place. Equipment for a new unit should follow the budget, with quantity and quality of various items thought out carefully. Develop the organization and staff of workers as the plans are carried out so that the number and type of workers needed will be there when the new facilities are opened. Remember that economical supervision of employees depends in part on layout and that the production area should be near the serving area. Train the employees thoroughly in food sales and serving techniques before opening.

INSTITUTIONS

Vol. 41, August, 1957

* Success with personnel hinges on management.—p. 7.
* Food service in miniature. C. R. Pensinger.—p. 10.
* Expert gives tips on how to improve cafeteria operation. DeA. Upton.—p. 48.

Sun country salad.—p. 102.

Personnel Success Hinges on Management. What are the solutions to the many personnel problems facing food service operators today? According to the three participants in this article, the answer is found primarily in improved management. It was agreed that if human relations in management are effective, then recruiting problems are reduced. One way of getting the different types of supervisory personnel that are needed is to bring in college students to work and look over the establishment during the summer prior to their graduation. Part of the industry's problem is the lack of social prestige for food service workers, and in this connection it was stated that employees are exceedingly sensitive to the attitudes of management. If management downgrades jobs, employees will quickly loose zest and feeling for their work. It was suggested that home economics be promoted on a broad, general scale to interest students and youth in the field, and it was stressed that not only management material, but workers on all levels except the lowest, are needed. It was suggested that the industry allow room for more individual creativity on the job to raise job satisfaction and prestige. In this connection, a big problem seems to be: how to get the food in all restaurants of a chain to be the same, and at the same time leave something in the cooking job to satisfy enough people so that the jobs can be filled? There is the problem of building into the skilled food jobs satisfactions to counteract standardization. This requires a skillful and artistic job of supervision, management, and training. Exhibition cooking is a prestige-building step that has been taken by owners of restaurants to insure the satisfaction of their cooks. To provide satisfaction through supervisory organization, it is important not to upgrade people who are good at technical jobs, but who would not be as happy or competent exercising managerial skills. Employers have been forced more and more to draw workers from the marginal group, but where training has been careful and adequate, no drop in efficiency as compared with ten years ago has been noted. It was asked whether, in the race with other industries for personnel, the five-day week is inevitable, and the answer was yes; mechanization will continue to cut work hours. Improved management and prefabricated foods will help control costs and eliminate those menial tasks that people don't want to do.

Use Models in Planning. One advantage of working with models is that it is easy to visualize how workers will move, where machines should be placed, and whether there will be enough room for equipment on wheels to make turns and go through doors. Models help eliminate costly mistakes. Industrial designers are well aware of this fact and the use of models in researching proposed plant layouts is a must. Models for large plants are custom made and often run as much as $200,000 but operators have learned from experience that they are well worth it. Photographs of the model layout and detailed sections provide a visual guide for future planning and actual construction. For those who are not skilled in reading blueprints, models provide a three-dimensional aid of inestimable value. Equipment salesmen can use models to advantage, too, in helping clients visualize their installations and equipment needs.

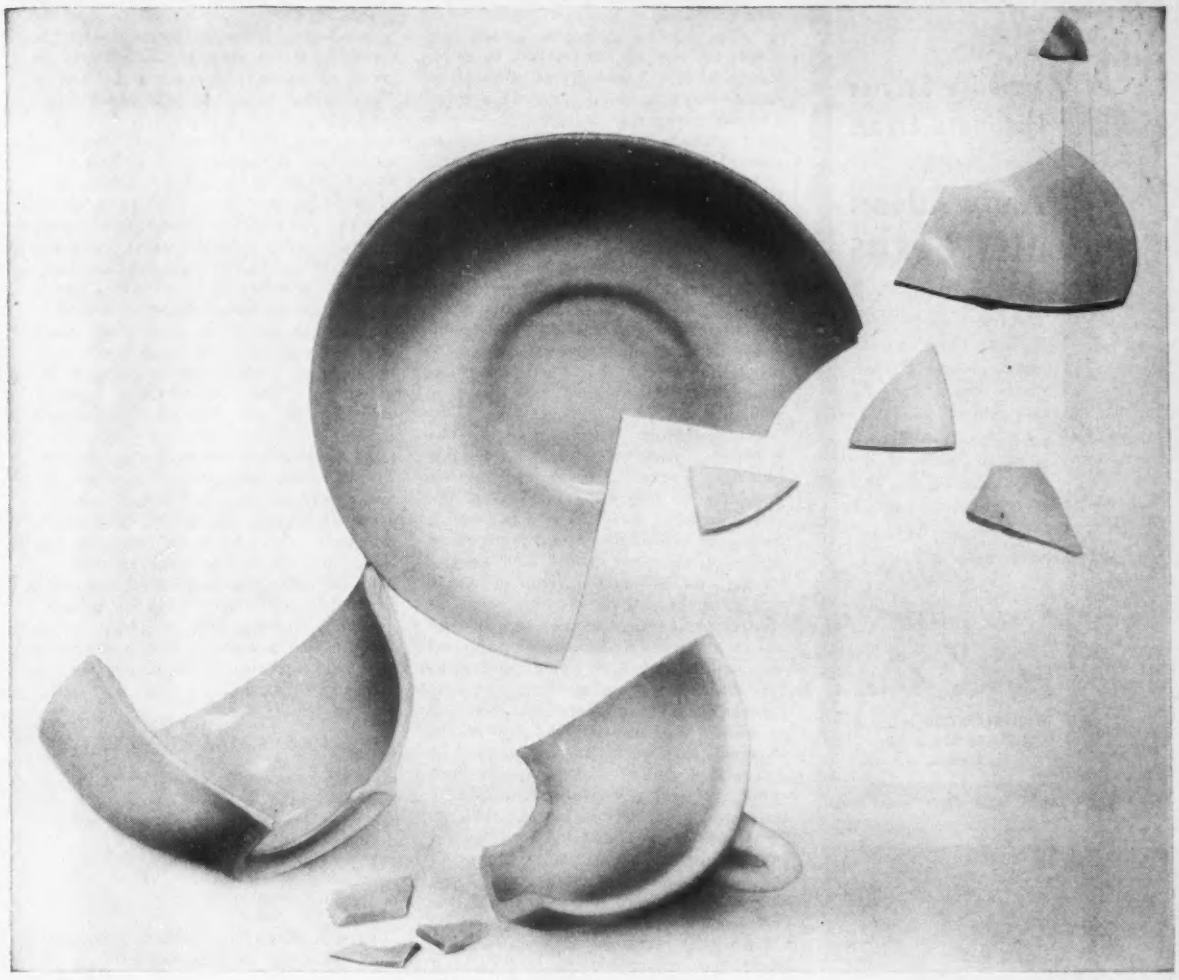
How to Improve Cafeteria Operation. It is much better to buy closely to needs and to public demand, determined by recording what the public buys when a variety of foods are displayed impartially on the cafeteria counter. The cafeteria manager should not try to push leftovers; basic food service operation does not force the public to pay for management mistakes. The author has discovered that discrepancies occur in the proper display of merchandise primarily because of the manager's personal likes and dislikes and his tendency to be percentage conscious. Letting the public decide the menu is a basic factor in successful food merchandising. The position of any item on the steamtable or counter as well as the combinations of items has a tremendous bearing on sales. A method of diagramming each steamtable and repeating the menu every two or three weeks and placing the items in the same position showed that the problem of leftovers, of pushing heavy items and of getting rid of yesterday's merchandise, extra orders, and all of the resultant confusion could be eliminated. All foods in the American way of life have a popularity rating. If food service operators take this fact into consideration, the leftover problem can be eliminated.

THE MODERN HOSPITAL

Vol. 89, August, 1957

* How to write a job description. J. H. Holmgren.—p. 60.
* Automation comes into the kitchen. R. L. Godfrey.—p. 112.

How to Write Job Descriptions. The job analysis results in a narrative description of each hospital job with the duties, responsibilities, degree of dif-

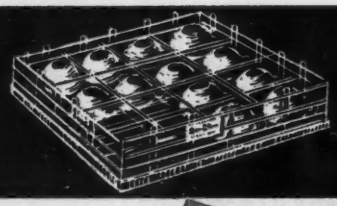


OVERHEAD GOING UP!

...how much depends upon how much breakage. You can count on breaking one-third of your entire stock of glass and chinaware by the end of 1957. This enormous cost will continue year after year until a Sani-Stack Wire Rack Handling System is installed—for only with Sani-Stack can you practically eliminate the main cause of breakage—*excessive handling*. Sani-Stack Racks reduce handling of glass and chinaware by as much as 70%. With a low-cost Sani-Stack System, a soiled dish or glass is touched but twice by human hands in its entire use-wash-use cycle. Compare this with your own operations; then call your nearest Sani-Stack dealer. He'll create a Sani-Stack Wire Rack Handling System designed to not only greatly reduce breakage, but save time and labor as well.

See our products at Western States Restaurant Show, San Francisco, Oct. 15–17; American Dietetic Ass'n Convention, Miami, Oct. 22-24; National Hotel Exposition, New York, Nov. 11–15

Sani-Stack racks are available in many models and sizes for dishes, glassware, cups, trays, silver, etc., in tinned wire, stainless steel and the amazing new Plastisol linings to fit every dishwashing machine or method. Leading dealers stock the Sani-Stack line. Check with your dealer or write direct.



Sani-Stack *a quality product of* METROPOLITAN WIRE GOODS CORP.
70 Washington Street ▪ Brooklyn 1, N. Y.

FREE!
"Better Dishwashing with Sani-Stack Racks." Write today for your free copy of Metropolitan's informative booklet and discover the many time, labor and money saving advantages of Sani-Stack.

Simplify Service Eliminate Errors with Aatell & Jones DIET CARDS

- HOLIDAY ITEMS
- PRINTED NAPKINS
- TRAY COVERS

Trays are easy to identify with these convenient 2¼" by 1¾" Diet Cards. Eleven standard diet subjects available, each on a different colored sturdy stock. Space allowed for patient's name, room and special notes. Write for samples and prices.

Aatell & Jones, Inc.

3360 FRANKFORD AVENUE
PHILADELPHIA 34
PENNA.

CRAMORES CRYSTALS
are ideal for institutional use, providing consistent year-round top quality real fruit flavor—at half the price.

★ *Easy to use and store—no spoilage—no squeezing*
★ *Economical—you always have just the right amount on hand*

CRAMORES CRYSTALS
made from a base of pure, dehydrated citrus fruit juices with fruit components added to enhance flavor and body—are available in lemon-lime and orange.

CRAMORE FRUIT PRODUCTS, INC.
Point Pleasant Beach, N. J.
The Home of "Big Sea Day"

ficulty, and required qualifications clearly defined. A summary of job duties is called a job description; the requirements for the job are referred to as the specifications. The body of the written job description should include a specification paragraph detailing the necessary training and experience requirements. Demarcation and delegation of lines of authority and responsibility should be spelled out in the opening statement; this description will follow the organizational structure of the hospital and each department. A statement concerning tools, equipment, and materials used in the performance of the job should also be included. Use specific terms rather than generalizations or broad definitions; i.e. "repairs steam, water, electrical and gas line," not "repairs utilities."

Automation Comes into the Kitchen. Automation and mechanization may supply the answers to the twin problems of vanishing employees and spiraling labor costs. Now it is possible to acquire for quantity food production, an electric mixer that will control mixing time. The cooking time of food in compartment steamers also can be controlled, leaving the cook free to work at other things. Reduction of personnel is possible with the timed, conveyor-type of dishwashing machine. Draw-off faucets on beverage dispensers designed to control and measure the flow of the beverage save both time and money. A new coffee maker that measures both coffee and water, controls the brewing time, and pours the coffee out through the faucet into a waiting container is another device helping to "automate" the institutional kitchen. Mechanization means that jobs, such as garbage removal and garbage-can cleaning, may be substantially reduced if not entirely eliminated. Safety devices are cutting down on employee time lost on the job. Self-leveling dispensing units, portable units for the storage of china and glassware, conveyor installations—all continue to be major time and labor savers. Further improvements in construction details, including the simplification of designs and use of stainless steel and other alloys, are steadily contributing toward higher standards of sanitation. Although great advances have been made in the design and production of good food service equipment, the needs of the industry are still great. Dietitians, using their expert knowledge of the needs to be alleviated, should offer suggestions for future developments. They should encourage more young people to become qualified research workers in institution management, specializing in time-and-motion studies, work simplification procedures, mechanization, and automation.

PERSONNEL JOURNAL

Vol. 36, July-August, 1957

Today's group training problems: a review and summing up. E. E. Jennings.—p. 86.

* Training supervisors by "feedback." L. Tarnopol.—p. 92.

How 47 companies measure their executives. J. A. Litterer.—p. 97.

Training Supervisors by "Feedback." The author maintains that the supervisor must be trained to handle the hostility of his work group properly. If he is so trained, by such a method as "feedback," he can then be expected to lead his group to a higher level of problem-solving. After four years of training experience in personnel relations at a West Coast utility, the author concluded that the time consumed in applying the principles of "feedback" at all levels in the organization was profitable in the long run. In some cases no significant changes in the attitudes of supervisors were evident until four years of training had been completed. Such changes, when they were finally effected, constituted marked improvement in attitudes. The "feedback" method concentrates on specific job-related problems by using material "fed back" from a comprehensive employee attitude survey. After twenty to thirty preparatory sessions over a two-year period, each supervisor leads his own work group in the feed-back meetings. A consultant sits in on each meeting to help the participants face up to their real problems. Experiments with two groups, a control group and a group using "feedback," revealed "feedback" as a decidedly superior technique in dealing with supervisors.

RESTAURANT MANAGEMENT

Vol. 81, August, 1957

Have you tried . . . ? M. M. Batey.—p. 19.

Kitchen cues—employee training. A. and G. Eiss.—p. 24.

New ideas for take-out food service. A. Easton.—p. 41.

* Five seafood specialties.—p. 46.

Five Seafood Specialties. The seafood dishes and recipes listed below are easy to prepare, attractively served, and profitable. The first dish, stuffed broiled shrimp, is made by the chef from flash-frozen shrimp, already peeled and deveined. The split shrimp is stuffed with an imperial crab mixture: claw crab meat marinated in dry sauterne with a touch of garlic added and the mixture bound by mayonnaise. The stuffed shrimp is wrapped in bacon and broiled for 4 min., then heated in a broiler oven for 8 min. Six shrimp are served on a bed of lettuce with drawn butter or ravigote sauce. The next dish consists of half a broiled Florida lobster filled with a Newburg mixture, fried swordfish fingers, shrimp, scallops, and oysters served with French fried potatoes, cole slaw, relishes, and assorted rolls. The chef-prepared entreé is called a de luxe seafood platter. Also popular is an entreé served in a Florida restaurant, pompano in foil. To prepare this dish, almond butter is spread on whole pompano before the fish is wrapped in foil. After garnishing with shrimp halves, the foil is sealed and the fish baked in a moderate oven. The foil is folded back just before serving to make sure it's steaming hot when it arrives at the table. Other recipes given in the article include: Creole shrimp and shrimp supreme, as well as fried fish sticks.

they're not well...

but they are well fed

aging

anorexia

burns

cancer cachexia

colitis

concussion

convalescence

fractures

hepatic cirrhosis

Sustagen® *powder*

the only single food complete in all known essential nutrients

- ***builds tissue***
- ***promotes well-being***
- ***accelerates rehabilitation***

hypoproteinemia

malnutrition

meningitis

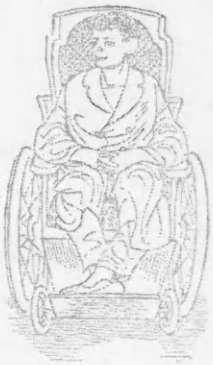
oral surgery

pancreatitis

peptic ulcer

postencephalitis

underweight



MEAD JOHNSON

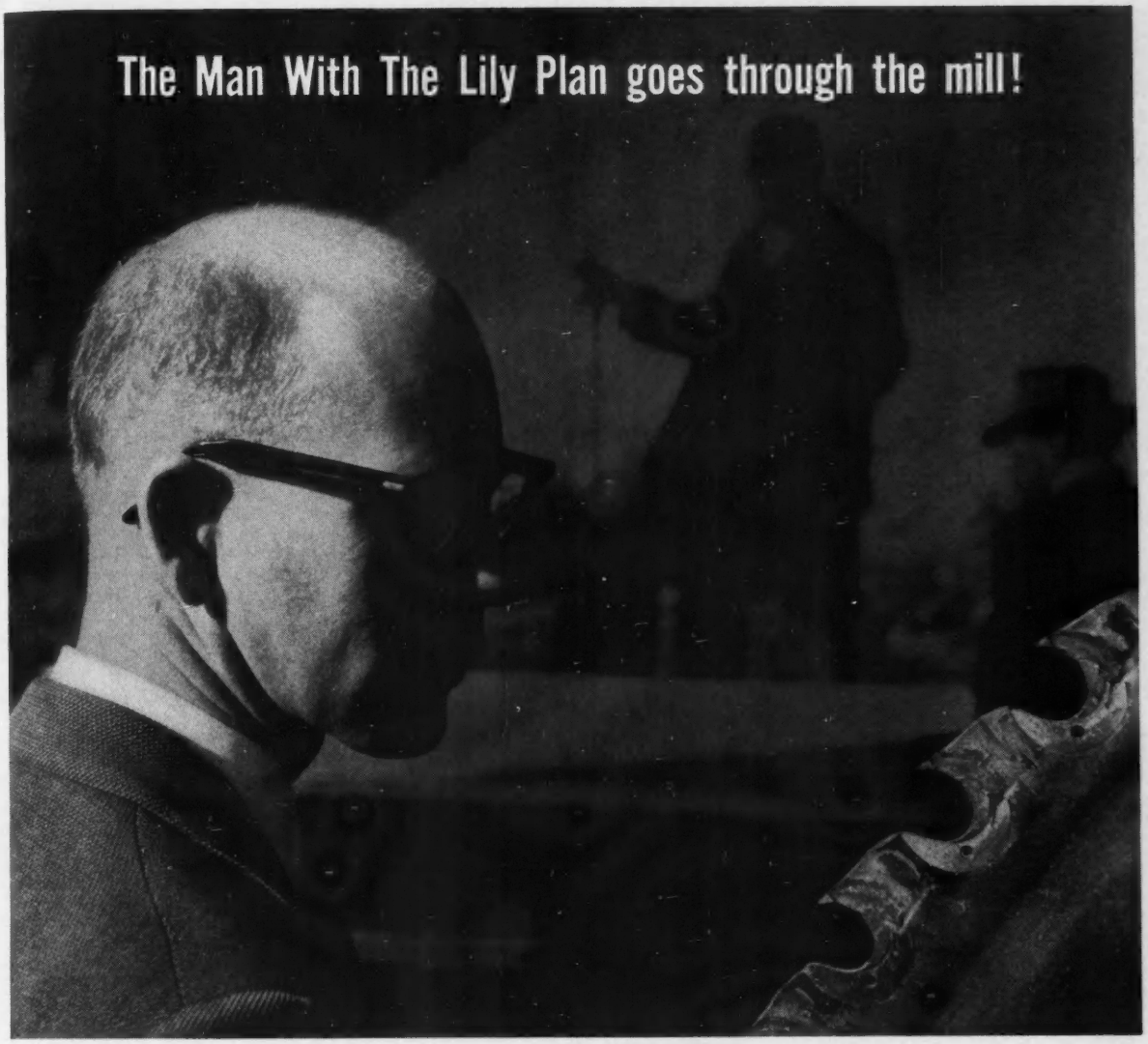
SYMBOL OF SERVICE IN MEDICINE

SU391

COMMERCIAL EXHIBITORS—40TH ANNUAL MEETING THE AMERICAN DIETETIC ASSOCIATION

Dinner Key Auditorium, Miami—OCTOBER 22–24

Aatell & Jones, Inc.
Abbott Laboratories
Allen Foods, Inc.
A. S. Aloe Company
Aluminum Cooking Utensil Company, Inc.
Amcoin Corporation
American Can Company
American Dry Milk Institute, Inc.
American Gas Association
American Institute of Baking
American Machine & Foundry Company
Armour & Company
Associated Blue Lake Green Bean Canners, Inc.
Automatic Food Shaping Company, Inc.
Avril Incorporated
Bernard Food Industries, Inc.
G. S. Blakeslee & Company
S. Blickman, Inc.
Bolta Products Div.—General Tire & Rubber Company
Boonton Molding Company
Borden Company
Bryant Electric Company
Buffalo China, Inc.
Calgon Co.—Div. of Hagan Chemicals & Controls, Inc.
Campbell Soup Company
Carnation Company
Cereal Institute, Inc.
Chicago Dietetic Supply House, Inc.
Chicago Molded Products Corporation
Cleveland Range Company
Cling Peach Advisory Board
Cockle Ventilator Company
Coffee Brewing Institute, Inc.
Corn Products Refining Company
Cory Corporation
Cramore Fruit Products, Inc.
Cream of Wheat Corporation
Crescent Metal Products, Inc.
Custom Food Products, Inc.
DCA Food Industries, Inc.—Institutional Products Division
Diamond Crystal Salt Company
Dietene Company
Diets Unlimited, Inc.
Diversey Corporation
Edward Don & Company
Dri-Heat Food System, Inc.
Du Bois Company, Inc.
Duke Manufacturing Company
E. I. du Pont de Nemours & Company, Inc.
Economics Laboratory, Inc.
Encyclopaedia Britannica, Inc.
Evaporated Milk Association
Fearn Foods, Inc.
Fish Equipment Company
Florida Citrus Commission
Food Machinery & Chemical Corp.
Foster Refrigerator Corporation
E. Fougera & Company, Inc.
W. H. Frick, Inc.
Frito Company
Frozen Food Forum, Inc.
General Foods Corporation
Gerber Products Company
Glenco Refrigeration Corporation
Gorton's of Gloucester
Green Giant Company
Groen Manufacturing Company
Hammons Company, Inc.
H. J. Heinz Company
Hilker & Bletsch Company
Hobart Manufacturing Company
Hotpoint Company
Institutional Feeding & Housing Institutions Magazine
International Molded Plastics, Inc.
Jackson China Company
Jarvis & Jarvis, Inc.
Kellogg Company
Kewanee Industrial Washer Corp.
Keyes Fibre Company
Klenzade Products, Inc.
Koch Refrigerators, Inc.
Kraft Foods Company
Kraft Foods Co.—Citrus Division
Legion Utensils Company, Inc.
Eli Lilly & Company
Lily-Tulip Cup Corporation
J. B. Lippincott Company
Lo-Sodium Dairy Products Corp.
Macmillan Company
Mansfield Aircraft Products Company
Market Forge Company
Mayer China Company
McCall Refrigerator Corporation
McGraw-Edison Company
Mead Johnson & Company
Mealpack Corporation
Meals-On-Wheels Crimsco, Inc.
Metropolitan Wire Goods Corporation
Middleby-Marshall Oven Company
Louis Milani Foods, Inc.
L. J. Minor Corp.
Monarch Foods
Multi-Counter Manufacturing Company
National Biscuit Company
National Dairy Council
National Live Stock and Meat Board
National Turkey Federation
Nestle Company, Inc.
Samuel Olson Manufacturing Co., Inc.
Onondaga Pottery Company
John Oster Manufacturing Company
Paper Cup & Container Institute, Inc.
Pepperidge Farm, Inc.
Pet Milk Company
Petersen Oven Company
Pfaelzer Brothers, Inc.
Chas. Pfizer & Co., Inc.
Pillsbury Mills, Inc.
Precision Metal Products
Processed Apples Institute, Inc.
Procter & Gamble
Quaker Oats Company
Qualheim, Inc.
Quality Bakers of America Cooperative, Inc.
Ralston Purina Company
Rath Packing Company
Rich Products Corporation
Ross Laboratories
W. B. Saunders Company
Savory Equipment, Inc.
Ad. Seidel & Son, Inc.
John Sexton & Company
Shampaine Electric Company
Shelley Mfg. Co.
Smithfield Ham & Products Co., Inc.
Southern Cross Manufacturing Corp.
Southern Equipment Company
E. R. Squibb & Sons
Standard Brands, Inc.
Star Metal Manufacturing Company, Inc.
Steele-Harrison Manufacturing Company
Sunkist Growers, Inc.
Swartzbaugh Manufacturing Company
Swift & Company
Syracuse China
T & S Brass & Bronze Works, Inc.
Toledo Scale Company
Unit-Packet Corporation
Unit Portions, Inc.
United Fresh Fruit & Vegetable Association
Universal Industries
Vacu-Dry Company
Vacuum Can Company
Webster Van Winkle Corporation
Victory Metal Manufacturing Corp.
Waring Products Corporation
Waste King Corporation
Watertown Manufacturing Company
Wesson Oil & Snowdrift Sales Company
Wilson & Company, Inc.
Wisconsin State Department of Agriculture
Wyandotte Chemicals Corporation



Result: A new, larger China-Cote cup that 'saves the flavor'

The Man With the Lily Plan is likely to turn up anywhere. This time he's in a mill. He's thinking "How can we streamline our operation here? Is there any way to make our famous, high-quality Lily* products even better?"

More often than not, he finds a way. As evidence, look at this new 16 oz. China-Cote cup. It "saves the flavor" of iced coffee, iced tea . . . keeps all large-size drinks fresh and inviting . . . cooler, too. Always firm when it holds cold drinks . . . safe and easy to handle!

All this results from the new *plastic inner lining.* Feel it. It's similar to real china. This lining, ten years in the development, prevents penetration of liquid into paper, saving the flavor, the coolness and the shape!

When you use a modern "one-time" cup like this it's faster—no washing, sterilizing, or breakage. You can easily handle the extra volume this cup is bound to create. Sensible idea! And there are more sensible ideas where it came from. Why not learn them all? Write us today for free information. *Lily-Tulip Cup Corporation, 122 East 42nd Street, New York 17, N. Y.*

*T.M. Reg. U.S. Pat. Off.

Lily Cups

Army's Program for Dietetic Students. The Department of the Army is sponsoring a new program to assist and encourage students in home economics, majoring in foods and nutrition or institution management, to become qualified dietitians. Under this plan, a student, after completion of either the sophomore or junior year, may enlist in the AMSC Reserve and remain in school to complete the work for her bachelor's degree. The student, during her enlisted Reserve status, will receive in excess of $200 per month. Payment of tuition and other fees incident to this education and graduation is the responsibility of the student.

On graduation, the student will apply for a commission as a Second Lieutenant in the AMSC and for selection for participation in an Army dietetic internship.

The length of pay-back time on active duty in the AMSC for the student will depend on the time spent in training under the AMSC Student Dietitian Program. If a student spends twelve months or less in a civilian college or university under the program, the obligatory tour is twenty-four months on commissioned active duty (in addition to participation in the twelve-month dietetic internship). If more than twelve months and not exceeding twenty-four months is spent under the program in a civilian institution, the obligatory tour is thirty-six months on commissioned active duty, in addition to the internship.

Further information about the program may be obtained from the AMSC Procurement Officer in the various regional Army Headquarters.

Honors for Kentucky Dietitian. Dr. Statie Erickson, University of Kentucky, was honored last spring when she was named recipient of the University's Algernon Sydney Sullivan medallion, an award given annually to the person judged the state's outstanding citizen of the year "who posesses most highly such characteristics of heart, mind, and conduct which evince a spirit of love for helpfulness to other men and women." In 1957, the University's Board of trustees named her "distinguished professor of home economics," the highest academic rank that can be accorded a member of the faculty. Dr. Erickson is the first person to receive both awards.

Dr. Erickson has been a member of the University's Home Economics faculty since 1925. In 1928, she was named Head of the department, and in 1953, Director, when the department was elevated to the rating of a school. She served in this capacity until last year, when she asked to be relieved of administrative duties.

Congressional Hearings on Weight-Reducing Preparations. Before its adjournment, the Government Operations Subcommittee of the House of Representatives of the U.S. Congress completed public hearings on false and misleading advertising of weight-reducing preparations. Rep. John A. Blatnik (D-Minnesota), as chairman of the subcommittee, stated in opening the hearings: "Information gathered by the subcommittee from authoritative medical sources states that weight cannot be reduced without decreasing food intake and that drugs at best are a 'crutch' to aid in adhering to a diet. The Postmaster General has estimated that weight-reducing promotions through the mails currently under investigation, are grossing between $2 and $3 million a year. These mail order promotions appear to be but a small fraction of the sales of similar preparations sold over the counter of drug stores. A spot check by the staff indicates that sales of the preparations in the Washington, D.C., area alone were about $1 million in the last twelve months. The national advertising budget for one of these preparations in 1955 exceeded $1 million."

After completion of the hearings, Rep. Blatnik noted that there is ample evidence that these preparations, although advertising with extravagant claims are, for the most part, worthless, and he expressed the hope that these hearings would provide the guide lines for appropriate action by Congress to provide greater protection to the consuming public.

The U.S.D.A. has released the following list of foods expected to be in plentiful supply during October:

Protein foods

Cheese
Chickens, broilers and fryers
Pork
Tuna, canned in oil
Turkeys

Other foods

Apples
Peanut butter
Peas, dry, canned, and frozen
Potatoes

Rice Enrichment. On August 27, a standard of enrichment for milled rice was published by the Food and Drug Administration.

Under the standard, each pound of milled rice that is labeled "enriched" must contain 2 to 4 mg. thiamine, 1.2 to 2.4 mg. riboflavin, 16 to 32 mg. niacin, and 13 to 26 mg. iron. Four oz. (a little more than ½ cup) of milled rice make about 2 cups of cooked rice, supplying 50 per cent of the minimum daily requirements for thiamine, 25 per cent for riboflavin, 40 per cent for niacin, and 32 per cent for iron. The cost of these enrichment ingredients would be about 5 cents per 100 lb. rice.

The standard allows two enrichment processes. One makes the product "rinse resistant"—resistant to loss of vitamins when it is rinsed before cooking. In such rice, a proportion of the kernels is impregnated with the vitamins and these kernels have a yellow color due to the riboflavin content. The standard would require packers to test this product to make sure that the loss in rinsing is kept to a specified minimum.

In the second process, all the rice is coated with the enriching ingredients. This rice is not changed appreciably in color. Its label would include: "Do not rinse before or drain after cooking."

The standard becomes effective six months after publication in the Federal Register unless objections are made.

At present, there is no rice on the market which fully conforms with the standard, although there are several products which contain varying amounts of some of the enriching ingredients. South Carolina has a compulsory enrichment standard which is the same as the new Federal standard except that riboflavin is an optional ingredient.

Compulsory Poultry Inspection. The recent Congress passed a Poultry Products Inspection Act which requires that by January 1, 1959, all poultry and poultry products moving in interstate commerce be inspected for wholesomeness. Currently, it is estimated that approximately 50 per cent of such poultry is already being inspected for wholesomeness under the voluntary inspection program provided by the U.S.D.A. on a fee basis. The act becomes partially effective on January 1, 1958, when plants approved by the U.S.D.A. may be provided the service.

Consumer Grades for Fresh Produce. Recently, the U.S.D.A. offered a continuous inspection service to the fruit and vegetable industry to lend support to the use of consumer grades. With so many fresh fruits and vegetables being prepackaged, it should be easy for the packages to carry U.S. grade designations of quality. Consumer grades could give household food shoppers the same advantage in purchasing fresh fruits and products that they now have in buying meat and poultry. So far, consumer grades have been formulated for only eleven vegetables and one fruit. The top consumer grade for most products is U.S. Grade A, which corresponds generally to the wholesale grade, U.S. No. 1.

Coming Events. The *American Public Health Association* will hold its 85th Annual Meeting in Cleveland, November 11 to 15.

In New York City, on the same dates (November 11 to 15), the *National Hotel Exposition* will take place.

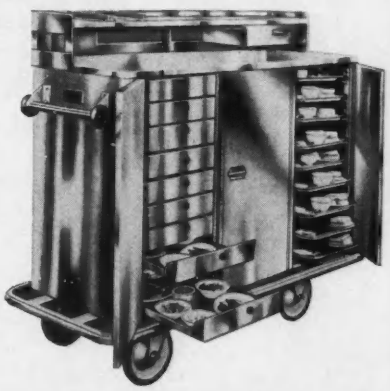
December 6 and 7 will be the dates for a postgraduate course for dietitians at the *Southwestern Medical School, The University of Texas*, Dallas. Emphasis will be on geriatrics.

feed more beds faster

...WITH SHAMPAINE-HARRIS FOOD TRUCKS...

NEW! CAFETERIA-ON-WHEELS

Load it in the kitchen with food for 75! Wheel it to corridor or pantry near the patients . . . always under supervision of dietician.
Hot and cold sections keep all the food "just right".
Space for trays, china, napkins, silverware. Everything handy.



"PREFERRED BY PROGRESSIVE HOSPITALS"

THE COMPLETE LINE OF FOOD SERVICE EQUIPMENT

Shampaine ELECTRIC COMPANY

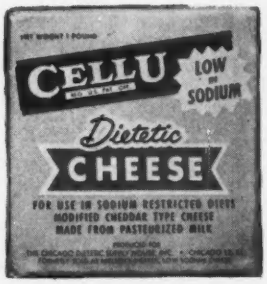
50 WEBSTER AVENUE, NEW ROCHELLE, N. Y.

Here's 24... Choice of many more

CELLU Juice Pak Fruits
CELLU Water Packed Fruits
CELLU Vegetables
CELLU Juices
CELLU Purees
CELLU Soups
CELLU Fish
CELLU Chicken
CELLU Milk
CELLU Peanut Butter
CELLU Relishes
CELLU Jelly
CELLU Salad Dressing
CELLU Bread
CELLU Flours
CELLU Wafers
CELLU Cookies
CELLU Baking Powder
CELLU K-Salt
CELLU Sugarless Sweetener
CELLU Gelatin Desserts
CELLU Puddings
CELLU Cool-Sip
CELLU Waylow Drops

and . . .

Here's another NEW CELLU dietetic product



CELLU DIETETIC CHEESE

(Low in Sodium)

For the first time under the CELLU label

—The golden-yellow, modified Cheddar-type cheese, formerly under Nielsen's label, has now been added to the CELLU line of Dietetic Foods. Adds variety to many low-sodium recipes. Sodium value is 9.5 mgs. in 100 grams or 3 mgs. in the average 1 oz. serving. Available in ½ lb. loaf sizes.

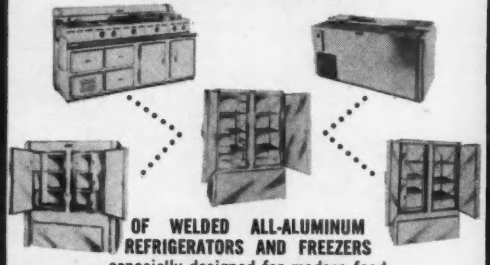
SEND FOR CATALOG LISTING COMPLETE LINE OF CELLU LOW-SODIUM ITEMS.

CHICAGO DIETETIC SUPPLY HOUSE, INC.
Dept. 12-U Chicago 12, Ill.

CELLU® dietetic foods

DINE WELL WITH CELLU FOODS!

FOSTER builds over 200 Matched Models



OF WELDED ALL-ALUMINUM REFRIGERATORS AND FREEZERS especially designed for modern food service dependability, 24 hours a day — year after year.

One Line One Price One Quality

FREE LITERATURE ON REQUEST

FOSTER

ORIGINATOR AND OLDEST CONTINUOUS MANUFACTURER OF REFRIGERATORS AND FREEZERS

Designed and engineered for heavy duty performance

Foster Refrigerator Corp. Hudson, N. Y.

Appointment at Kansas State. Beginning with the fall quarter, Grace Shugart has been appointed Head, Department of Institutional Management, Kansas State College, Manhattan. Mrs. Shugart served last year as acting-head of the department, following Bessie Brooks West's retirement from administrative duties.

Mrs. Shugart is a graduate of the State College of Washington and holds a master's degree from Iowa State College. Her dietetic internship was served at the University of Minnesota Hospitals. Her experience has included that of a hospital dietitian; owner and operator of a restaurant in Ames, Iowa; Food Director of the Iowa State College cooperative dormitories; and Instructor in Institutional Management, Iowa State College. She has been Director of Residence Hall Food Services since joining the Kansas State staff in 1951. Mrs. Shugart will serve as President of the Kansas Dietetic Association for 1957–58.

Foreign Assignments for Members. During the coming year of 1957–58, Dr. Ercel S. Eppright, Speaker-Elect of the House of Delegates for A.D.A., will be an instructor at the Queen Aliya College for Women in Baghdad, Iraq, under a year's appointment with FAO. In addition to her teaching duties, Dr. Eppright will serve in an advisory capacity in developing the home economics curriculum of the college and in planning a program of home economics education in Iraqi secondary schools and training centers. Dr. Eppright's full-time appointment is that of Professor and Head, Department of Food and Nutrition, Iowa State College, Ames.

In another part of the world, Dr. Martha Potgieter will serve as guest lecturer in nutrition this fall at the University of London. Dr. Potgieter is Associate Professor of Nutrition, The University of Connecticut, Storrs.

Nutrition Problems in Latin America. From September 23 to October 1, the Food and Agriculture Organization and the World Health Organization sponsored the Fourth Conference on Nutrition Problems in Latin America in Guatemala City. The program included discussion of the following main topics: progress in Latin America in the field of nutrition since the third conference in Venezuela in 1953; the development and utilization of food resources, with special reference to protein-rich foods; education in nutrition; and national nutrition policy.

Hospital Dietetic Workshop. In July, the Department of Dietetics of the John A. Andrew Memorial Hospital, Tuskegee Institute, sponsored its second annual hospital dietetic workshop for food service workers and supervisors from small hospitals and nursing homes in Alabama, Florida, and Georgia. The program was planned to provide experience with recent trends in food preparation and service, with the following subjects discussed: the medical team, planning the basic menu to include ade-

For the fine new
Elementary School
in Swansea, Massachusetts . . .

Installation by H. A. Johnson Co., Boston

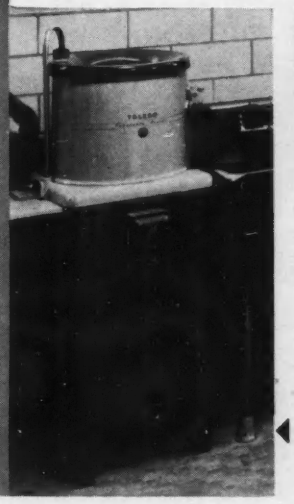
Modern Kitchen Service with TOLEDOS

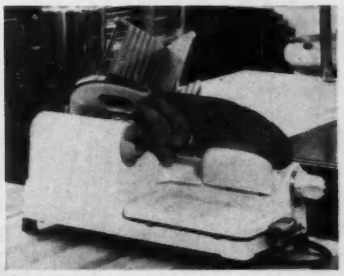
Hot lunches for hungry students are quickly prepared at low cost with the help of work-saving Toledos . . . in the well-planned kitchen of the new Elizabeth Stevens Brown School at Swansea!

A Toledo Slicer proves just what the kitchen staff needs for fast, uniform portioning of meats, vegetables and other foods. A Toledo Peeler gets large quantities of potatoes ready in a jiffy with complete "skin deep" peeling . . . and minimum labor! Clean-up time and costs are substantially reduced by using a Toledo Conveyor Dishwasher with Pre-Wash.

You, too, will find Toledos the right choice to get high production in your kitchen operations with low-maintenance dependability. Write today for new catalogs on the Toledos for your needs.

TOLEDO CONVEYOR DISHWASHER with Pre-Wash . . . Automatic conveyors transport dishes through wash and rinse chambers with high production per hour.





TOLEDO SLICER . . . illuminated platter and gravity-feed . . . convenient and versatile for all slicing of meat, cucumbers, tomatoes and other foods. Exclusive "Quick Weigh" Estimator.

TOLEDO PEELER . . . sharp abrasive on both disc and cylinder provide efficient "double action" peeling with minimum waste.

SERVICE Factory-Trained 200 Cities

TOLEDO SCALE COMPANY, Kitchen Machine Division, 245 Hollenbeck St., Rochester, N. Y.

DISPOSERS— Heavy-duty. Fast, sanitary. Sizes ½ to 5 HP.

DISHWASHERS— Door, counter and conveyor. Capacity to 12,600 dishes hourly.

CHOPPERS— Full size range. 1/3 HP to 25 HP. Meet all needs.

MIXERS— Efficient, modern, dependable. Positive gear drive.

SAWS— Feature extra large working area. Easy to keep clean.

BIG JUICY SAVINGS...

and delightful flavor, too... with

BOMBAY *California Valencia*
ORANGE AND GRAPEFRUIT BASES
AND ORANGE & GRAPEFRUIT BLEND

As little as $0.0148 per 4-ounce serving Grapefruit; $0.0157 per 4-ounce serving Orange; $0.0152 per 4-ounce serving, Blend. More than the minimum daily adult Vitamin-C requirement in every 4-ounce serving. Chosen by leading institutions for its delightful taste-appeal. Sample gladly sent without obligation. Write on your letterhead.

If Your Jobber Can't Supply You... Write Direct—
THE H. R. NICHOLSON CO.
Kenshaw & Oakleaf Ave. Baltimore 15, Md.

NEW!

Bring Your Cost-Per-Servings up to date!
with Seidel's Free 1957 Charts

Lists over 100 of the most popular items being served in institutional feeding today. Baked goods, including icings and meringues, beverages, desserts, meat dishes, soups, preserves, marmalades and fruit butters, salad bases — even special diet foods. No up-to-date, cost-controlled kitchen should be without it. Sent promptly—*while supply lasts*— without obligation.

AD. SEIDEL & SON INC.
Seidel FOOD SERVICE
1245 W. Dickens St., Chicago 14, Ill. *102 Franklin St., New York 13, N. Y.*

quate intake of food nutrients, food cost accounting, dietary treatment of obesity, and diabetes, purchasing, employee training, and economical aspects of frozen foods. During the workshop, the dietary staff, dietetic interns, and consultants lectured, showed films, and gave demonstrations on "The Ration Pattern," "Feeding the Paraplegic," "Sanitation and Safe Food Practices," "Work Simplification," and "Preparing and Serving Boneless Meats."

U.S.D.A. Publications. The tenth and final in the U.S.D.A.'s series of reports on the 1955 Household Food Consumption Survey has been released: *Dietary Levels of Households in the West.* According to this report, diets of families in the West supplied the highest amount of fat per person, while those in the Northeast, the lowest. In the West, household food supplies averaged about 5.7 oz. dietary fat per person per day, compared with 5.6 oz. in the North Central region, 5.5 oz. in the South, and 5.1 oz. in the Northeast. Dietary fat sources were similar in the West, North Central Region, and Northeast, but in the South, less dietary fat came from dairy products and meat, poultry, and fish, while more was derived from bacon and salt pork. Lard and other shortenings used for home baking were also much more important sources of dietary fat in the South. For other nutrients, the West scores about the same as for the U.S. as a whole, with calcium and ascorbic acid being the two nutrients most likely to be short. About a fourth of the western families fell short of the recommended allowances for these two nutrients, and a slightly smaller proportion were short in thiamine and riboflavin. The West was above the national average in the proportion of families meeting vitamin A recommendations. Single copies of this report may be obtained on request from the Office of Information, U.S. Department of Agriculture, Washington 25.

"Production of Frozen Prepared Foods—1954–55" is the U.S.D.A.'s Marketing Research Report No. 170, in which the phenomenal growth of this segment of the frozen food industry is reported. Marketing data on eleven groups of foods which include 173 individual items are presented. Copies may be ordered from the Government Printing Office, Washington 25 for 15 cents each.

A third new U.S.D.A. publication is "Consumer Purchases of Fruits and Juices by Family Characteristics—Oct. 1955—Mar. 1956," which is numbered CPFJ-47, and dated July 1957. Classification of data is according to: family income, presence of children, size of community, geographic region, size of family, occupation of family head, education of family head, and age of housewife. This is the seventh of a series of such reports covering selected six-month periods beginning in October 1949. Requests for copies should be directed to the Office of Information, U.S. Department of Agriculture, Washington 25.

"The Special School Milk Program

KOCH EXPOSES INSIDE STORY

We leave outer space to the children and to the scientists. Our concern is with INNER SPACE, the USABLE, NET SPACE inside your refrigerator.

"Gross Capacity", which often is referred to only as "capacity", is the total space within the refrigerator. You can't use all of this space because much of it (sometimes 20% or more) is taken up with refrigeration equipment, and other space-consuming items.

"Net Capacity", which is always referred to as "net", is the actual usable food storage space —after all unusable areas have been deducted from the gross.

When you purchase a household refrigerator, you automatically know the "Net Capacity", because household refrigerators, WITHOUT EXCEPTION, are rated in NET TERMS.

When you purchase a commercial refrigerator, you're entitled to know what you buy... and what you're getting for your money. You can't always use a ruler to make your own measurements.

You can be sure, however, if you specify Koch, because Koch ALWAYS gives certified NET capacities. When you shop, compare NET with NET. You're really paying for net capacity —why not get it?

See you in Booth 611 at the Miami Show, October 22-24.

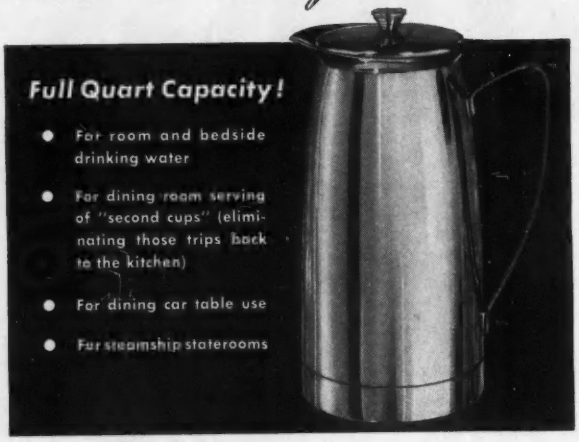
Call your KOCH spaceman for the complete story on INNER SPACE.

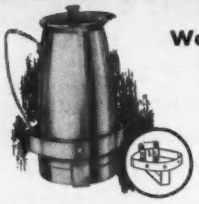
SEE OUR CATALOG IN SWEET'S ARCHITECTURAL FILE OR WRITE FOR COPY

KOCH refrigerators, inc. KANSAS CITY 15, KANSAS

Keeps liquids **HOT** or **COLD**

GRAND NEW *Stanley* PITCHER-SERVER


Full Quart Capacity!
For room and bedside drinking water
For dining room serving of "second cups" (eliminating those trips back to the kitchen)
For dining car table use
For steamship staterooms



Wall Bracket For Extra Convenience

Handsome chrome-plated wall bracket holds pitcher-server snugly and safely. Padded lining protects polished chrome finish.

ORDER FROM YOUR SUPPLIER OR WRITE:

STANLEY INSULATING DIVISION
of Landers, Frary & Clark, New Britain, Conn.

FAMOUS TRUE FRENCH-STYLE **HABITANT SOUPS** now available in institutional size cans!
(#5 cans - 50 oz. advp.)

Serve your customers these deliciously different soups:

- **CANADIAN PEA** The ONLY genuine French-Canadian pea soup in an institutional size!
- **VEGETABLE SOUP**
- **FRENCH ONION SOUP**
- **CHICKEN** -with-noodles
- **MINESTRONE** (not condensed)

Save Time . . . Save Money!

Distributed by GEORGE GARDELLA CO.—
2036 Howard Street—Detroit 16, Michigan

in Los Angeles, Calif.—A Preliminary Report" is the U.S.D.A.'s Marketing Research Divisions publication AMS-179. According to this booklet, average daily milk consumption per pupil in Los Angeles city elementary and secondary schools serving milk more than doubled in the first year after the Special Milk Program was started in September 1955. In elementary schools, the increase was 68 per cent; in junior high schools, 250 per cent; and in senior high schools, 200 per cent. The report gives details of the operation of the program, as well as of the population involved, including the educational levels of adults in the districts served, income level, size of school, and age of students. Copies may be requested from the U.S.D.A.'s Office of Information, Washington 25.

FAO-WHO Report on Additives. "General Principles Governing the Use of Food Additives" is the title of the First Report of the Joint FAO/WHO Expert Committee on Food Additives. According to an expert committee which met in Rome in December 1956, the use of a food additive is justified when it serves to maintain the nutritional quality of a food, to enhance its keeping quality or stability with resulting reduction in food waste, or to make it more attractive to the consumer, or when such use is technically indispensable in food processing. The use of these substances should be prohibited when the aim is to disguise the effects of faulty processing and handling techniques or to deceive the customer, when such substances decrease the nutritive value of the food, or when the desired effect could equally well be obtained by other and satisfactory practices. Authorization to use any additive should always be based on the considered judgment of qualified scientists that the intake of the additive will be substantially below any level which could be harmful. Furthermore, permitted additives should be subjected to continuing observation for possible deleterious effects under changing conditions of use. Finally, the consumer should be informed of the presence of an additive in a food—for example, by means of a declaration on the package. Copies of this report, which is FAO Nutrition Meetings Report Series No. 15 and World Health Organization Technical Report Series No. 129, may be purchased for 30 cents each from International Documents Service, Columbia University Press, 2960 Broadway, New York 27.

Flavor Symposium. In May 1957, a symposium on the "Chemistry of Natural Food Flavors" was sponsored by the National Academy of Sciences—National Research Council for the QM Food and Container Institute of the Armed Forces and the Pioneering Research Division, QM Research & Engineering Center. The proceedings of this symposium have now been published. Some thirteen papers are included in chapters covering the following topics: "Techniques and Methods for Research in Flavors," "Fruit and Vegetable Fla-

Save on LABOR COSTS 3 Ways...

SWISS STEAKS: Tender and flavorful Available: 4, 5 and 6 oz. Cost per oz.: 5 to 8c, depending on quality desired.

P.B. PORTION-READY MEATS

. . . *with* **Pfaelzer Brothers**

Portion-Ready Meats

Portion-Perfect! . . . for Perfect Portion Control®

SAVE on portioning!

P.B. Portion-Ready Meats are ready to cook and serve when received. You avoid proven-costlier, on-premises butchering.

SAVE on handling!

P.B. Portion-Ready Meats are conveniently packed in compact, light-weight, 10 lb. cartons . . . that are easier to check in, store and transfer. You save time, effort and man-hours.

SAVE on sanitation!

With P.B. Portion-Ready Meats, there is no mess to clean up beforehand or afterward. Sanitation presents no maintenance problem in refrigerator or kitchen.

Write Today for New MEAT BUYERS GUIDE!

This *free* 16 page, beautifully illustrated brochure highlights the many advantages derived from the use of Pfaelzer Portion-Control Meats. Tells how to achieve maximum efficiency in your food department by controlling costs, quality and waste—while adding variety to your menus.

Pfaelzer Brothers also offer a full line of oven-ready roasts and primal cuts of beef, lamb, pork and veal; also poultry, seafoods, provisions and food specialties. Complete price lists sent on request.

pfaelzer SERVING 48 STATES

pfaelzer BROTHERS, INC.

Union Stock Yards • 939 West 37th Place • Chicago 9, Illinois

Pioneer and Pace-Setter in Portion-Control Meats

vors," and "Flavors of Processed Foods."

Single copies of this symposium may be obtained by writing Chief, Technical Services Office, QM Food and Container Institute for the Armed Forces, 1819 West Pershing Road, Chicago 9.

Symposium on Minerals Reported. Five papers on the general topic of "Some Inorganic Elements in Human Nutrition" are now published in booklet form by the Council on Foods and Nutrition, American Medical Association. Originally presented at a symposium in April 1955 in Nashville, the papers are:

"The Metabolic Role of Zinc"—Bert L. Vallee

"Metabolism and Requirements of Iron in the Human"—Carl V. Moore and Rubenia Dubach

"Copper Metabolism in Man"—Clark J. Gubler

"Magnesium Deficiency Syndrome in Man"—Edmund B. Flink

"Physiological Basis of Potassium Therapy"—Daniel D. Darrow

Copies of this booklet may be requested from the Council on Food and Nutrition, American Medical Association, 535 North Dearborn Street, Chicago 10.

Composition of Peruvian Foods. Just released is the second edition in Spanish of "La Composicion de los Alimentos Peruanos," compiled by the Ministerio de Salud Publica y Asistencia Social, Servicio Cooperative Interamericano de Salud Public, and Institute de Nutricion of Lima, Peru. In it is reported the composition of 421 Peruvian foods in terms of: calories, water, protein, fats, carbohydrates, fiber, ash, calcium, phosphorus, iron, carotene, thiamine, riboflavin, niacin, and reduced ascorbic acid. Foods are categorized in fourteen groups: milk and its products; eggs; meats; fish; shellfish and mollusks; oleaginous foods; legumes and their derivatives; greens; fruits; tubers and roots; cereals; sugars and sweet products; beverages; and miscellaneous foods. Of special interest is a section in which the scientific name of certain foods is present for many of the foods listed by their common names. Authors of this report include: Carlos Collazos Ch., Philip L. White, Hilda S. White, Eduardo Viñas T., Enrique Alvistur J., Renán Urquieta A., Juan Vásquez G., César Días T., Alfonso Quiroz M., Amalia Roca N., D. Mark Hegsted, and Robert B. Bradfield.

British Food. The sixth in a series of annual reports on the national food supplies in Great Britain is now available under the title, "Domestic Food Consumption and Expenditure: 1955." Like the previous reports, the present volume describes the diets of households in different income groups and of different family composition. It also has a special section dealing with the diets of different household types within each social class, and the usual analysis of urban and rural diets has been amplified to distinguish Greater London from other large cities. The year 1955 was the first full year after the end of rationing, and data in this report reflect increased differences associated with the size of the family due to this change. The composition of the diet during 1955 was similar to that in 1954, but there was an increase in real consumption as estimated by revaluing at constant prices the quantities purchased. Changes in most of the main food groups were small, the only marked increase (6 per cent) being that for meat, which for the first time reached parity with 1934–38. However, less beef was consumed than before the war and more imported canned meat and more pig-meat, of which less was in the form of bacon.

Food supplies in 1955 were in every respect of greater nutritional value than before the war, with the most marked change recorded for calcium and thiamine. A 60 per cent increase in calcium, due to increased milk consumption and fortification of flour is reported. More than half of the 30 per cent increase in thiamine was also due to changes in the composition of flour.

Copies of this report are on sale at H. M. Stationery Office, London, for 6s. 6d. per copy.

Allergy Booklet. Some 17 million people suffer from allergy, according to an estimate published in "Allergy—A Story of Millions," published as Public Affairs Pamphlet No. 253. It describes the kinds of allergies—asthma, hay fever, hives, eczema, and others,—indi-

For the best solution to every TOAST problem...

There's no substitute for Savory

SEE OUR EXHIBITS AT BOOTH 107—OCT 1 ADA ANNUAL MEETING, MIAMI, OCTOBER 22-24, 1957, AND AT BOOTH 1038, NATIONAL HOTEL SHOW, NEW YORK COLISEUM, NOVEMBER 11-15, 1957.

Fast, convenient and dependable toasting during busy meal times is the answer to a serious problem—in hospitals, schools and institutions.

Undersized or inadequate toasting equipment creates service delays and appetite appeal may be destroyed unless toast is served crisp, fresh and hot.

Savory automatic conveyor type toasters provide the greastest toast production possible—6 to 12 slices per minute—and perfect golden brown toast every time.

Ask your Kitchen Equipment Dealer to show you how Savory can speed up food service and provide greater economies, or write:

Savory EQUIPMENT, INCORPORATED
120 Pacific St., Newark, N. J.

See for yourself why Primex is preferred by thousands of successful restaurants!

Not just quality, but *superior* quality is the reason why pure, all-vegetable Primex is used by so many thousands of restaurants for all their frying. Primex is always uniform, always dependable, always *outstanding* in every property you want in a frying fat: bland flavor . . . high smoke point . . . resistance to breakdown . . . freedom from rancidity and from objectionable odor. On top of all this, Primex has a longer frying life . . . delivers maximum production at minimum cost. So, remember this important fact: Primex has set the standard of quality and performance for years. And today's Primex is the best ever! Try it!

Superior for pastry baking, too! Fine hotels and restaurants all over America depend on Primex to put the finest eating quality into their pie crusts, cookies and rolls! For frying . . . and pastry baking . . . Primex is tops!

Call your local Procter & Gamble Representative for all the facts about Primex. Ask him, also, about the free service rendered by the P&G Research Kitchens.

No matter what you fry, it will look better . . . taste better . . . give greater customer satisfaction if you fry it in

PURE ALL-VEGETABLE **PRIMEX**

The 'Longer Frying Life' Fat

PROCTER & GAMBLE

. . . leader in quality products and service to the food industry.

Makers of PRIMEX • SWEETEX • PERTEX • SELEX

cating causes and tells how they are diagnosed and treated. A number of areas for research in allergies are also described. This booklet may be ordered, at a cost of 25 cents each, from Public Affairs Committee, 22 East 38th Street, New York 16.

Communication Film. "Production 5118" is the title of a film dealing with the subject of person-to-person communications, which the National Project in Agricultural Communications recommends. Produced by the Champion Paper Company, Hamilton, Ohio, it is suggested for showing at staff meetings, seminars on communication; city, county, and state home economics meetings; and workshops. Further information may be obtained from the company.

Interns Graduate. At Oklahoma State University, the first class of administrative dietetic interns were honored at graduation exercises on August 15. Clay Potts, Director of the University Food Units, presided at a graduation dinner, at which certificates and pins were awarded to the following:

Janet Hightree, University of Nebraska
Janice Long, University of Massachusetts
Joseph Paulk, University of Alabama
Glee Talbot, Pacific Union College
Janell Hickman, Oklahoma A. & M. College

IT'S HERE... IT'S NEW! THE FIRST AND ONLY PRACTICAL 3-COMPARTMENT SELF-GENERATING STEAM-COOKER!

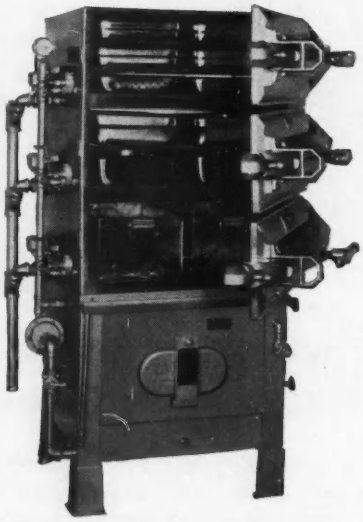
Here it is—the *first* full-size 3-compartment steam cooker that *generates its own steam*—the 3SF by STEAM-CHEF!

Without any increase in floor space, here is greater capacity than ever before available in a self-generating steam cooker.

The spacious cooking compartments of the 3SF accommodate up to 18 standard 12 x 20 cafeteria pans, or a combination of these with deep pans, wire baskets, and bake trays. All told, this latest addition to the famous STEAM-CHEF line of "Side-by-Side", high capacity steam cookers can hold up to 6 bushels of food.

The new design of the 3SF steam generating unit provides abundant steam for big cooking or warming jobs in a hurry. The cooker is designed for kitchens serving 700 or more meals an hour.

All three of the cooking compartments are within easy reach. Overall height of the cooker is only 67 inches! Compartments are wider—cafeteria pans fit easily "Side-by-Side". There's no awkward groping for pans-behind-pans. Loading and unloading is easier, faster, safer... so is checking food at any time during the cooking cycle.



Model 3SF STEAM-CHEF 3-compartment steam cooker. Self generating. Interior: Stainless steel. Exterior: Baked enamel or stainless steel. Height: 67". Floor space: Under 10 square feet. Available for gas or electric operation.

Steam-cooking with Steam-Chef has many other advantages. They're all available in this new Model 3SF. Ask your nearest STEAM-CHEF dealer to demonstrate them to you, or get complete details by writing to:

THE CLEVELAND RANGE COMPANY
"The Steamer People"
3333-L Lakeside Avenue • Cleveland 14, Ohio

Army Personnel. The following changes in personnel for the Army Medical Specialist Corps have been reported:

Appointments and Active Duty
Capt. Martha E. Smith
1st Lt. Carmen D. Melendez-Rodriguez
Separations
Capt. Alice B. Watkins
1st Lt. Helen J. Vawter
1st Lt. Gloria S. Morris
2nd Lt. Maureen D. Bird

Second Lieutenant Louis E. Deremiah has been promoted to first lieutenant. The appointment of 1st Lt. Lucille Lawrence has also been announced.

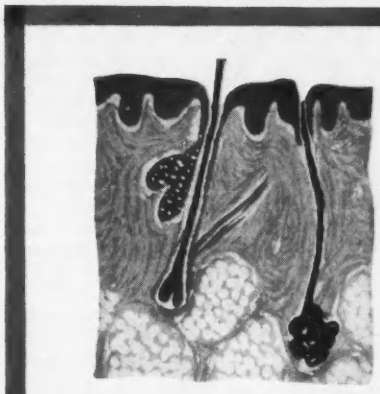
Coffee Consumption in the U.S. In the second quarter of 1957, U.S. families bought 2.3 per cent more coffee than during the same period last year—399 million lb. roasted coffee compared with 390 million lb. a year ago. Instant coffee sales continued to increase and were up 23 per cent over a year ago; instant coffee represented 20 per cent of the total volume of coffee purchases during this period, as compared with 16 per cent a year ago, according to the Pan-American Coffee Bureau. Sales of regular coffee in both bags and vacuum cans declined 1.8 per cent from 326 million lb. to 320 million lb.

For the first six months of 1957, total household purchases of coffee were 2 per cent ahead of 1956, with regular coffee sales trailing 2.5 per cent behind last year, but instant coffee showing a 26 per cent gain.

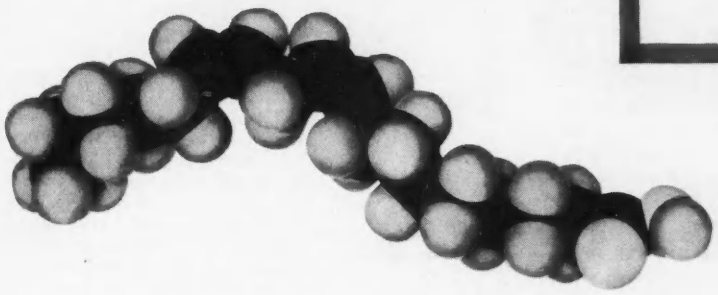
Pink in Poultry Meat. What makes cooked turkey meat pink? According to the U.S.D.A., poultry meat that turns pinkish during roasting, even when thoroughly cooked, is still safe to eat and is not changed in flavor or other qualities. Research at the U.S.D.A. Western Utilization Research and Development Division, Albany, California, has shown that substances in the atmosphere of a heated oven or in the hot air of an outdoor fire may react chemically with substances in poultry meat to give it a pink tinge. These are the same substances that give a reddish color to smoked hams and other cured meats. It is often the meat of younger birds that shows the most pink, since their thinner skins allow oven gases to get through to the flesh underneath. The amount of fat in the skin also affects this pinking.

Another problem is the darkening and reddening of some poultry bones. From the Iowa Agricultural Experiment Station comes the report that freezing and thawing, which break down the blood cells of the bone marrow, cause a deep reddish color to show. Here, too, bones that showed this discoloration were those of young birds.

Tomato Powder. Tomato powder—for sauce, soup, juice, and dry prepared mixes—will soon be on the market, climaxing several years' work at the U.S.D.A.'s Western Utilization Research and Development Division, Albany, California. The powder mixes well with



TO SUPPORT INFANT SKIN INTEGRITY



linoleic acid

CLINICAL OBSERVATION: Among 27 infants fed a formula providing less than one percent of calories from fat, 10 manifested dryness, thickening and leatheriness of the skin, with desquamation. Symptoms cleared on the addition of linoleic acid to provide two percent of the caloric intake.[1]

BIOCHEMICAL SIGNIFICANCE: Breast-milk fat has about 3 times the total essential fatty acid content of butterfat, and has a higher proportion of linoleic acid.[2]

NUTRITIONAL PROTECTION: By virtue of its corn oil—olive oil—coconut oil content, Similac has been made physiologically comparable to breast milk in essential fatty acids. As a result, regular Similac feeding provides important prophylactic benefits against eczema and other skin disorders of infancy.[3]

And Similac has the nutritional advantages of a thoroughly integrated and physiologic food for infants.

SIMILAC®

there is no closer equivalent to the milk of healthy, well-nourished mothers

RESEARCH · SERVICE · NUTRITION · Ross

ROSS LABORATORIES
Columbus 16, Ohio

References:
1. Hansen, A. E.; Adam, D. J. D.; Boelsche, A. N.; Haggard, M. E.; Wiese, H. F.; Pratt, E. L., and Hunter, V.: Fed. Proc. *16*:387, Part I (March) 1957.
2. Macy, I. E.; Kelly, H. J., and Sloan, R. E.: The Composition of Milks, Publication 254, Washington, National Research Council, rev. 1953, p. 66.
3. Hansen, A. E., and Burr, G. O.: J. A. M. A. *132*:855 (Dec. 7) 1946.

water. Packaged to keep moisture content low, it holds its quality even under severe conditions.

Other practical, instant tomato products are also being developed or improved at the Western laboratory, including improved methods for preparing concentrated tomato paste (for soups, catsup, and so on) which are already being used by some commercial firms. Studies are now being done on the effects of concentrating tomatoes beyond the usual level of 26 per cent solids. In testing products with solids contents ranging from 5.6 per cent (ordinary single-strength juice) to 38.4 per cent (very thick concentrate), it was found that flavor, color, and ascorbic acid decrease as concentration, processing time, and temperature increase. Excellent products can be obtained, however, at all concentrations.

Family Use of Milk. Recent surveys from the Virginia, Mississippi, and South Carolina Agricultural Experiment Stations have indicated that whether the family gets enough milk is up to the homemaker. In Virginia, in an industrial city, the homemaker's average consumption of milk was about half that of her husband's, yet the use of milk in the family was directly related to hers. Only half the women interviewed appeared to recognize the value of milk, and 40 per cent of the families had too little.

A survey in Mississippi in four towns indicated that milk programs should center on the homemaker because: (a) she does most of the food shopping, (b) her milk-drinking habits affect the use of milk by her family; and (c) she used less milk than others.

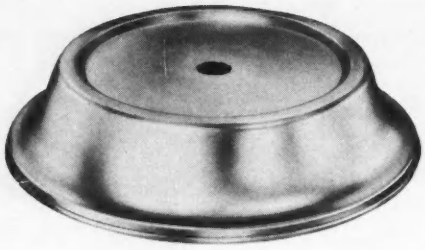
In South Carolina, the use of milk by town and country families showed that teen-age girls, women, and low-income families are most in need of more milk. This Station suggests that nutrition education should start in grade schools for those girls who don't finish high school but who will be tomorrow's homemakers. The education of the homemaker had much to do with whether the family had enough milk, according to findings of this survey.

New Sweet Potato Products. At the U.S.D.A.'s Eastern Utilization Research and Development Division, Philadelphia, researchers have prepared deep-fat fried sweet potatoes from the eastern "dry" type of sweet potato. Those to be eaten immediately were fried for 5 to 6 min. at 275°F. Those for frozen storage were removed from the fat after 4 to 4½ min., as cooking can be completed by oven-heating just before serving. The result was a savory, high quality food product. As potential snack foods, deep fried chips, julienne strips, and diced sweet potatoes were also tested. These foods were packed in capped glass jars and stored in the dark at room temperature. After five months' storage, they were still crisp and flavorful, and consumer-type panels of laboratory employees and visitors approved their color, texture, and flavor.

New Fall Apples. A new variety of apple, the Barry, has been developed by the New York State Agricultural Experiment Station, Geneva. It is a fall variety, ripening about two weeks ahead of the McIntosh, thus filling the gap between that variety and the Early McIntosh. The Barry comes from a cross first made in 1923 between the McIntosh—the most important variety in the Northeast—and the Cox Orange, an old European variety of high quality but little known in the U. S. The first crop of the new Barry was borne in 1947, and it has fruited every year since. The Station reports that the Barry has a solid, deep yet lively red color, flesh that is light amber in color, and is firm, crisp, and juicy, with a pleasant mildly tart flavor. It is rated high as an apple for eating out of hand, as well as with the best sauce varieties of its season. It is especially recommended as a home garden variety.

Ice Cream Consumption. During 1956, ice cream production in the United States according to the U.S.D.A., was approximately 650,985,000 gal., more than double that of 1940. The greatest share of this ice cream is sold in bulk, to be dipped into cones, fountain servings, or take-home cartons. Next in sales volume is the pre-packaged pint.

Year-Round Fresh Peach Flavor. A purée peach concentrate and a frozen peach nectar concentrate are two new products developed at the U.S.D.A.'s Eastern Utilization Research and De-



Nesting stainless steel

PLATE COVERS

LEGION has the largest assortment in the United States—from 7¼" to 11½" in diameter.

Don't spoil the appearance of your dining room with unsightly dirt-pitted, grease-filmed or discolored covers.

Legion's lustrous platinum finished covers are light, durable and easy to keep clean.

No pitting from detergents
No denting by dishwashers
They are a lifetime investment.

Easy to store—
they save valuable storage space.

LEGION UTENSILS CO.
21-09 40th Ave., Long Island City 1, N. Y.
Branch offices:
21 East Van Buren Street, Chicago, Ill.
420 Market Street, San Francisco, Calif.

LEGION UTENSILS CO.
PIONEERS IN STAINLESS STEEL

"Visit our exhibit N 604, American Dietetic Association, October 22–24, Dinner Key Auditorium, Miami, Fla."

NEW Ideal COMBINATION

. . eliminates loose ends in CENTRAL FOOD SERVICE

IDEAL Mealmobile, Model 9020-BCT with built-in beverage dispenser and mechanical refrigeration.

The new IDEAL Mealmobile with mechanical refrigeration and built-in beverage dispenser, together with the new Idealmobile, Model FS-100, hot food assembly unit, now make it possible for you to have a complete food service system that is thorough, fast and efficient.

The Mealmobile with its mechanical refrigeration, can now be used as a cold food storage unit. This permits the loading of salads and other cold items well in advance of food serving time and eliminates peaks and valleys in the work load in the kitchen. The new IDEAL Mealmobile in combination with the new Idealmobile hot food assembly unit, enables you to move foods directly from the hot food preparation area to the most convenient assembly area — thus speeding up food service.

The complete IDEAL centralized food service system introduces a cyclical operation in the movement of food from kitchen to patient . . . done the same way every time. And efficiency increases each time!

This IDEAL combination offers efficient centralized food service for all hospitals—regardless of size. Additional units may be added to meet your needs —present and future.

Idealmobile Model FS-100 hot food assembly unit

★ Visit our booth 601 at the American Dietetic Show, October 22-24.

Write for assistance in your kitchen planning

Ideal® HOSPITAL EQUIPMENT
Found in Foremost Hospitals

Made only by the
SWARTZBAUGH MANUFACTURING COMPANY
MURFREESBORO, TENN.

velopment Division, Philadelphia. With the purée concentrate, a fuller-flavored peach ice cream may soon be on the market. The frozen peach nectar concentrate is much like the frozen orange juice concentrates now on the market.

The secret of the flavor-appeal of these peach products is the capture of the volatile flavor essences. In the new process, the peaches are puréed and treated so that they do not turn brown. Then juice and pulp are separated. The volatile essences are saved from the juice, then concentrated. Finally, the pulp, essences, and juice are combined and homogenized.

Lengthening Shelf-Life of Candies. Shelf-life of candies can be improved in many cases by adding antioxidants, or glycerol, but for the most effective protection the stabilizing additive should be selected with regard to fat use, according to Helen M. Robinson, U.S.D.A. Southern Utilization Research and Development Division, New Orleans. Candies containing freshly churned butter kept better than those made with high-score butter which had been stored under refrigeration. Animal fat shortenings supplied by the manufacturer contained an antioxidant, butylated hydroxyanisole, and were as stable to oxidative rancidity as vegetable fats, but had a tendency under some conditions to form free fatty acids with an objectionable odor. In all, eleven antioxidants gave excellent protection against oxidative rancidity. Glycerol retarded the formation of free fatty acids but had no effect on oxidative rancidity, while antioxidants useful in preventing the latter type of spoilage did not prevent formation of free fatty acids. Single copies of reprints of this study, "Stabilization of Fats in Candy: II. The Importance of Free Fatty Acids," which appeared in *The Manufacturing Confectioner*, may be obtained on request from the Southern Utilization Research and Development Division, 1100 Robert E. Lee Blvd., New Orleans 19.

Yes, it's still hot!!
thanks to . . .
J&J fast-service
FOOD TRAY TRUCKS
designed to speed tray service from floor diet kitchens, heated tray trucks, subveyor stations, and special dumb-waiters.
specifications
Model 1359, left, has stainless steel shelves, aluminum bronze chassis. Also available in polished stainless steel throughout, or in aluminum bronze finish throughout.
Length Overall 25" Height Overall 42"
Width Overall 21" Shelf Clearance 7"
Shelf Size 16½" x 24"
. . . the dietician's perfect answer to the age-old problem of transporting food to the patient and having it hot and appetizing on arrival. 4-tray unit combines mobility with stability . . . the two essential requirements in hot food delivery. Four double ball-bearing swivel casters with 5" ball-bearing rubber-tired wheels facilitate fluid motion, yet prevent chance of upset accidents or uneven motion that might slop or spill liquids. Swept-back handle makes it easy to maneuver without kicking the unit or bumping it with the knee.
These serviceable units nest when not in use to conserve valuable space in corridors.
Nationally Distributed Through Quality Dealers
Sales Representatives In Leading Cities Throughout The Country.
Jarvis AND J&J Jarvis, Inc.
PALMER, MASSACHUSETTS
In Canada: Jarvis & Jarvis of Canada, 1744 William St., Montreal, Quebec
7JJ58

News of State Associations

Connecticut Dietetic Association. Elected officers for 1957–58 for the Connecticut Dietetic Association will be: President, Esther Woodruff, VA Hospital, West Haven; President-Elect, Erma Burton, Newington; Treasurer, Beatrice M. Boucher, Wallingford; and Secretary, Ann Rockwood, Hartford Hospital, Hartford.

The 1957 recipient of the Connecticut Dietetic Association's $100 scholarship for dietetic interns is Verna C. Hems, Wallingford, who graduated in June from the University of Connecticut, Storrs, and is now a dietetic intern at Massachusetts General Hospital, Boston.

Georgia Dietetic Association. In its project of career guidance through dietetic teas, the Georgia Dietetic Association, beginning in December 1957 and running through May 1957, has held some fifteen teas in different cities of the state. Additional meetings with high school home economics teachers and dietetic interns from out-of-state have also been held. At some of these meetings, attendance has numbered more than a hundred.

Iowa Dietetic Association. Officers of the Iowa Dietetic Association for the coming year will be: President, Doris Hittle, Ames; President-Elect, Roberta McHenry, Davenport; Treasurer, Jeanne Larson, Ames; and Secretary, Rosetta Cerny, Cedar Rapids.

Kentucky Dietetic Association. Shirley Osborne Gibbs, a graduate of Berea College, has been named the recipient of this year's annual scholarship of the Kentucky Dietetic Association. Mrs. Gibbs is now a dietetic intern at Oklahoma A. and M. College, Stillwater.

Rhode Island Dietetic Association. In Rhode Island, officers for 1957–58 will be: President, Helen Curtin, VA Hospital, Providence; President-Elect, Marjorie Barry, Providence; Treasurer, Irene Sweeney, Apponaug; and Secretary, Gertrude Cooke, VA Hospital, Providence.

Texas Dietetic Association. The scholarship fund of the Texas Dietetic Association has been renamed to honor Elmira Blecha, formerly on the staff at the VA Hospital, Houston.

BAKEABANANA!

—discover a new vegetable that goes with meat, fish and poultry!

Bananas, a vegetable? That's right! When you bake bananas this new way, they have a mellow flavor that makes any favorite main dish taste better. And bananas, like many vegetables, have a well-rounded supply of vitamins and minerals. Include a lesson on baked bananas when teaching your students the fun of good nutrition. Have them try baked bananas soon!

BAKED BANANAS

4 firm bananas* **1½ tbsp. melted butter or margarine**

Peel bananas. Place in greased baking dish. Brush with butter or margarine. Bake in moderate oven (375° F.) 15 to 18 minutes or until bananas are tender . . . easily pierced with a fork. Serves 4.

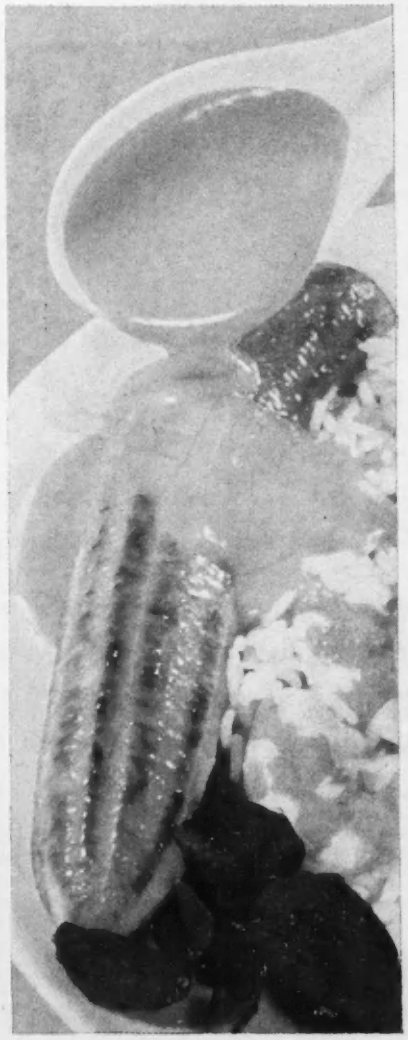
Baked bananas with currant jelly: Spoon red currant jelly over baked bananas, and serve hot with turkey. Good, too, with other poultry or beef.

Baked bananas with curry sauce: Pour your favorite curry sauce over baked bananas. Serve hot with rice and shrimp, or other seafood.

Baked bananas with mint jelly: Spoon mint jelly over baked bananas. Or try it with ham—delicious!

**Use all-yellow or slightly green-tipped bananas*

UNITED FRUIT COMPANY



Association Activities

Combating Food Misinformation. To review activities in the area of combating food misinformation in this country, representatives from the American Dental Association, American Medical Association, American Public Health Association, American Home Economics Association, and The American Dietetic Association met in Chicago on August 28.

There was agreement that the American Library Association be contacted to indicate the interest of these organizations in having an opportunity to cooperate in reviewing books in the area of foods and nutrition for the *ALA Journal*. Another meeting is being considered to include additional organizations which are conducting programs in this area.

Representatives at State Meetings. A.D.A. representatives will be attending the following fall meetings of state dietetic associations:

November 1–2—Geraldine Piper, North Carolina Dietetic Association, Asheville
November 1–2—Edith Jones, South Carolina Dietetic Association, Columbia
November 6—Edith Jones, New Jersey Dietetic Association, Princeton
November 8—Effie May Winger, Maine Dietetic Association, Orono
November 9—Bessie B. West, Colorado Dietetic Association, Pueblo
November 14–16—Clara Zempel, Louisiana Dietetic Association, Baton Rouge
November 15–16—Bessie B. West, Washington State Dietetic Association, Tacoma
November 15–16—Helen Ger Olson, Mississippi Dietetic Association, Biloxi
November 16—LeVelle Wood, Kansas Dietetic Association, Wichita
December 6–7—Helen Hawver Anderson, Arizona Dietetic Association, Phoenix

YOU ASKED FOR IT...

CONVENIENT DISPENSING!

FLEX-STRAWS NOW PACKED

***in a convenient* DISPENSER BOX**

MINIMUM HANDLING...MAXIMUM PROTECTION

FLEX-STRAWS are distributed quickly and efficiently from the new dispenser box. Straws are removed at corrugated section so that it is never necessary to touch either the end which is immersed or the end which touches the mouth; assuring maximum protection and sanitation. One or several FLEX-STRAWS can be dispensed with minimum time and effort. The dispenser tab may be closed between uses. ORDER FROM YOUR DISTRIBUTOR NOW.

HPF

FLEX-STRAW COMPANY 2040 BROADWAY • SANTA MONICA, CALIF.

Canadian Distributors: Ingram & Bell, Ltd. • Toronto

NACEF. We thought the following highlights reported from the meeting of the National Advisory Committee on Emergency Feeding (NACEF) to Federal Civil Defense in Washington, D. C., April 2 and 3, would still be of interest to you. This condensation of the official release has been prepared by Evelyn L. Anderson.

Ralph L. Garrett, Director, Welfare Office of FCDA, pointed out the necessity for reorienting the feeding program. We have talked about an initial mass feeding plan, but radiologic fallout prohibits such arrangements. The feeding problem in the initial period is one of distribution to the people where they are located. Afterwards, when they can be moved, a mass feeding program would be undertaken.

Due to the problem of radiologic fallout in an enemy-caused disaster with survivors being pinned down to one place for a period during which they would have to subsist on food which has been stored in the home, the Committee considered the practicability of families increasing the seven-day supply now advocated. The Committee went on record as "approving the promotion of a one-month's rotating supply of groceries, including water and liquids for home survival."

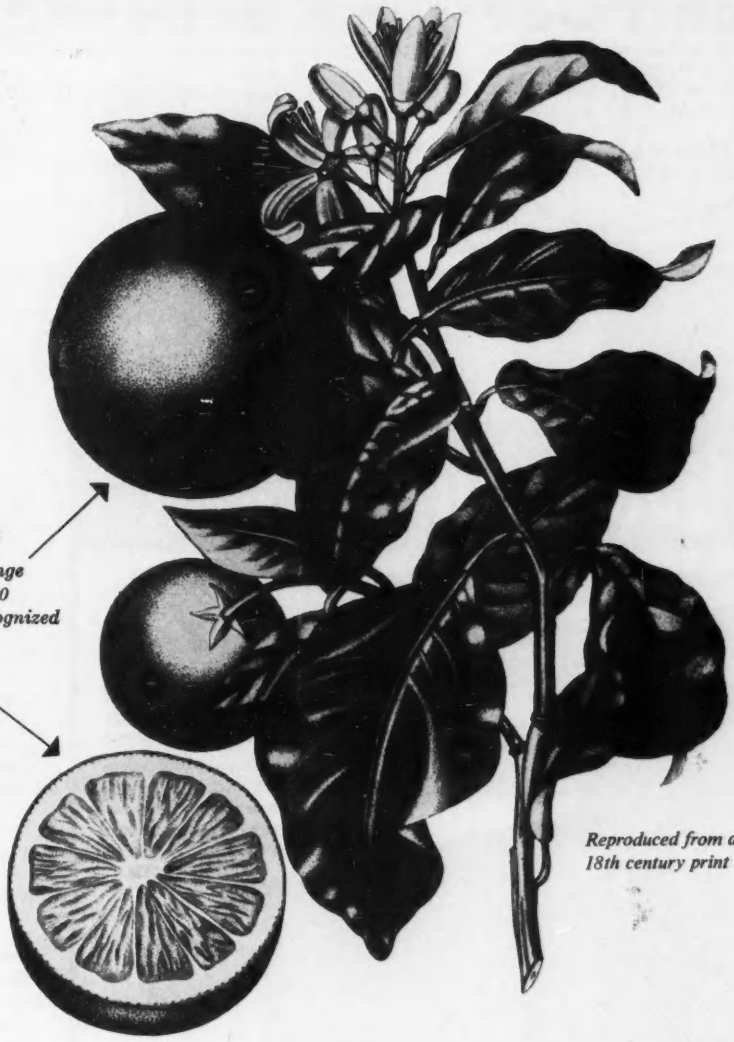
Mr. Garrett reported on a recent exercise at FCDA Headquarters in which it was found that "as population in a given location was reduced after atomic attack, food supplies increased proportionally." In seven days there was a forty-two-day supply of food on hand, but after sixty days, there was a sixty-day supply due to the deceased population. The problem after the first sixty days becomes one of transportation of food from production points. FCDA is working with the Department of Agriculture on this and also the production of food after a disaster."

When a large segment of the population is moved to a safe area, it is possible that no facilities will be available and also that feeding on a mass basis might have to continue for a long period.

Reprints Available. The following are a few of the excellent reprints which are still available from A.D.A. Headquarters office but have not recently been listed in the *Publications and Reprints list:*

Administration

"Tools for Evaluating the Hospital Department of Dietetics"—10 cents
"Trends in Administration of Hospital Food Service" by Lucille M. Refshauge—5 cents
"Management Development—Fad or


CITRUS BIO-FLAVONOIDS
One average-size peeled orange provides approximately 1,000 milligrams of the newly-recognized citrus bio-flavonoids.
Reproduced from an 18th century print

Of the FIFTY different health values known to be in a fresh orange, several are found mainly in the "meat" of the fruit.

These include the important bio-flavonoids, protopectins, and pro-vitamin A. In fact, an average-size Sunkist Orange provides 10 times more bio-flavonoids, 10 times more protopectins and 3 to 6 times more pro-vitamin A than an equal amount of frozen orange juice.

These values in the meaty part of oranges are the reason why more and more nutritionists and doctors are recommending *fresh* oranges for their patients... *fresh* oranges for eating and *fresh* orange juice (with healthful solids left in it). And, of course, they recommend Sunkist Oranges ... always the highest quality.

Sunkist Oranges *from California and Arizona*

Fundamental" by Ray H. Coffman—10 cents
"Tools for Cost and Quality Control" by Katherine Hart—15 cents
"Labor in the Dietary Department" by Elsie L. Bakken and Mary W. Northrop—20 cents
"Cost of Fringe Benefits" by Ruth Gould and Katherine Hart—10 cents

Accounting
"Cost and Nutritional Accounting Go Hand in Hand" by Ruth A. Reams—15 cents
"Business Goals and Accounting Tools" by Neva Henrietta Radell—10 cents

Personnel
"Training Employees in Work Simplification" by Marjorie M. McKinley, Grace M. Augustine, and Hester Chadderdon—15 cents
"Techniques of Supervision" by Edward Norman—15 cents
"Employee Attitudes Are Surveys to Improve Personnel Relations" by Jean Shaffer—10 cents

A new *Publications and Reprints* list will be available at our Annual Meeting in Miami this month.

Obituary

Mabelle Sperry Ehlers. The A.D.A. office has been notified of the death on July 2 of Mabelle Sperry Ehlers in Manhattan, Kansas. Mrs. Ehlers, until her retirement in 1950, was Head, Department of Institution Administration, Michigan State College. She had made her home in Manhattan with her brother, Professor Emeritus in Geology, of Kansas State College. She had been an A.D.A. member since 1942.

Qualheim VEGETABLE CUTTERS AND SLICERS

Recommended by Dieticians who know their equipment!

Model '101' in action!

SLICE 100 POUNDS OF BUTTERED CARROTS IN LESS THAN 10 MINUTES
Operator in process of cutting carrot sticks. This is one of the four basic operations without special attachments possible with the Qualheim model 101.

SAFE
SIMPLE
EASY TO CLEAN
EASY TO OPERATE
PERFECT CUT VEGETABLES

SEE *the model 101 and the new model 400 (not illustrated) for smaller kitchens at our Booth #122, October 22-24*

AMERICAN DIETETIC ASSOCIATION, DINNER KEY AUDITORIUM, MIAMI, FLORIDA

For literature and name of nearest dealer, write:

QUALHEIM, Inc.
1201 Racine St. Racine, Wisc.

QUALHEIM, *the pioneer with 25 years experience in vegetable preparation equipment*

Visit our exhibit #122, American Dietetic Association, October 22-24, Dinner Key Auditorium, Miami, Fla.

News of Products and Services

Vischer Products Company is introducing two new five-compartment Flex-Seal speed cookers, the largest in the line. One model requires a direct steam connection; the other has its own steam generator. Each has capacity to prepare 720 to 900 servings an hour to meet the need of "small batch" volume cooking. Flex-Seal speed cookers cook with "dry" steam without adding water.

An individual foil package containing a single ½-oz. serving of Peter Pan brand sweet catsup has been added to *Brooks Foods, Inc.*, institutional products. Also packaged in the portion-pak containers are Brooks Tangy Catsup and Brooks Barbecue Sauce. The portion-paks are packaged in four 250-unit boxes per case.

"On the Color of Coffee" is one of the newer publications of *The Coffee Brewing Institute, Inc.* It is a reprint of a paper originally published in *Food Technology* by Angela C. Little and G. Mac Kinney, Department of Food Technology, University of California, Berkeley. In it is reported work which establishes a relationship between roasting temperature and the color of roasted ground coffee, the relative concentrations of ultraviolet-absorbing components in the aqueous extracts prepared under standardized conditions, and the color of the aqueous extracts. A method is suggested for predicting the roasting conditions needed to develop a desired color in a given sample, or conversely, for predicting the color of a sample roasted at a given temperature.

Also available from *The Coffee Brewing Institute, Inc.*, is a small pamphlet titled "Coffee Brewing." In it are detailed methods of making coffee by urn brewing (including instructions for cleaning the equipment) and by vacuum brewing.

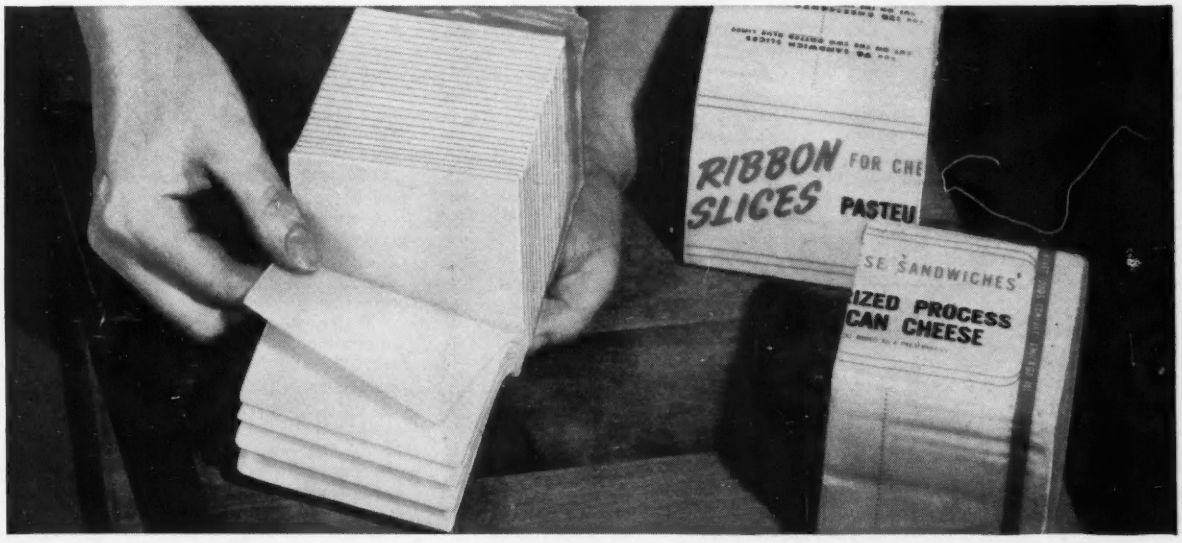
Allmetal Food Equipment Corp., announces a new self-contained sandwich unit of stainless steel, which can be used interchangeably with other food service units in a back-bar or counter line-up. The new unit features a large refrigerated base and is available in depths of 24- or 31-in. Plugged in to any standard electrical outlet, the new unit is ready for use. It is available with or without toaster.

Allmetal also is offering a pizza preparation table. A refrigerated base is designed to store pizza dough, and an overhanging shelf with five individual compartments provides space for the pizza ingredients. A working table top of marble, stainless steel, or maple is optional. The unit can be constructed in various sizes to meet specific requirements.

Packet Brand, a new line of mustard,

Already Sliced to Save You Time

Kraft Ribbon Slices

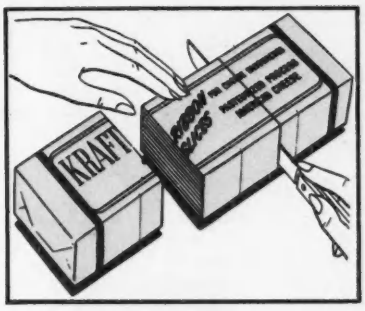


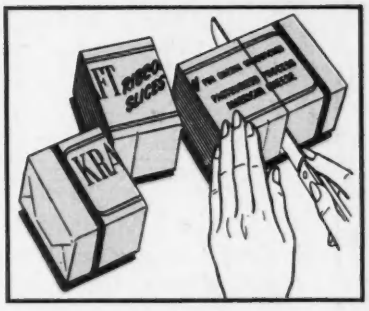
KRAFT'S Dotted Line PACKAGE INCREASES PROFITS 3 WAYS

① **You save time.** Following simple cutting directions, you get perfect slices of top-quality pasteurized process American cheese—in seconds.

② **You eliminate waste.** No need to trim Ribbon Slices.—No broken pieces, slivers or dried-out edges.

③ **You get perfect portions.** Each Ribbon Slice is uniform in size, shape and weight. Unlike bulk cheese, you can measure costs to the penny.



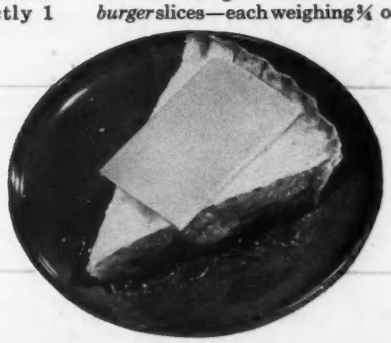


Control your costs with perfect portions

BLUE LINES. (1-oz. slices). Cut on blue dotted lines to get 48 *sandwich* slices—each weighing exactly 1 ounce.

RED LINES (¾-oz. slices). Cut along red lines to get 64 uniform *cheeseburger* slices—each weighing ¾ ounce.

Kraft Ribbon Slices are America's biggest seller—and with good reason. These famous golden slices are the very essence of profitable portion control. Every slice is just right—same size, same weight, same cost. Try Ribbon Slices now. It pays.



KRAFT Foods Company INSTITUTIONAL DIVISION

THE NATION'S TASTE IS YOUR BEST BUYING GUIDE

KRAFT FOODS COMPANY 500 Peshtigo Court • Chicago 90, Illinois

ketchup, and Parmesan cheese packed in individual servings, is being introduced by *Unit-Packet Corporation*. These condiments are packaged in air-tight, moisture-proof, individual portions, with easy-pour spouts. The individual serving packages offer cost control for food service operations.

Victory Metal Manufacturing Corporation has a new Vimco Model RS-40-S stainless steel reach-in refrigerator featuring interchangeable interiors that will take any combination of bakers' trays, stationary or pull-out meat rails, stationary or pull-out shelves, refrigerated drawers, storage and steamtable pans, or cafeteria trays. Interior accessories can be changed in minutes without the use of tools. There is 50 per cent more useable space in any given floor area through the use of ball-bearing pull-out shelves that permit easy access to items stored at the rear. The capacity of the unit is 50 cu. ft. It measures 50¼ in. wide, 33½ in. (exclusive of hardware) deep, and 72¾ in. high. It is available in self-contained, remote, and pass-through forms.

An analysis of the merchandising experience of five classes of successful restaurants has been reported by Donald R. Greenaway and Gertrude G. Blaker, School of Hotel, Restaurant, and Institutional Management, Michigan State University. Their survey included: cafeterias, drive-ins, independent restaurants, multi-unit restaurants, and specialty houses. The report covers such policy matters as: internal operating practices, personnel practices, internal merchandising practices, advertising practices, and participation in community and business life. Two chapters also deal with trends in sales and net profits and "profiles of success." The study was made for the Institutional Products Division, *General Foods Corporation*, in cooperation with the New York State and National Restaurant Associations.

To complete its line of molded pulp plates in dinner, luncheon and dessert sizes, *Lily-Tulip Cup Corporation* is introducing a new 9¼-in. compartment plate, duplicate of the old china "blue-plate." As a companion plate, there is a new 9¼-in. luncheon plate which, like the compartmented plate, is more rigid, stronger, and whiter in color. Used as a lid for the compartment plate, the two can be stapled together for send-out service and can be conveniently stacked to save space. The plate is designed for smaller portions, in line with the trend of portion control and to please a diet-conscious public.

Water, under pressure of 50-lb. per square inch, is passed through the coffee grind in the *Rosander Company's* new automatic coffee maker reported to be the only coffee maker using the pressure method. Infusion time for 1¼ gal. is said to be 3¼ min. A small compressor, standard with every unit, generates the pressure with the flick of a switch. All water, gas, and electric controls are standard connections and the brewing cycle is completed automatically, delivering the exact amount of water at the exact temperature and the same infusion time. Two reservoirs hold 7 gal. hot water at 210°F. and 4 gal. brewed coffee at a serving temperature of 180°F. Sight gauges show the level of the liquids in the unit. A container for storing brewed coffee is provided; individual brews need not be mixed with one another. One brew can be completely served before the fresh one is passed into the serving container. Coffee is drawn from the reserve supply of unserved coffee, and the hot water reserve is available for tea, chocolate, or other purposes.

"Cylan" sodium cyclamate has been introduced as a sodium-based, nonnutritive sweetener by *E. I. duPont de Nemours & Company*. It is intended primarily for use in formulations containing ingredients which would not be compatible with calcium, such as recipes with phosphates, tartrates, and oxalates, where calcium would form insoluble salts. Both Cylan calcium and sodium cyclamate provide levels of sweetness thirty times that of sugar, and are stable through a *pH* range of 2 to 10, and at temperatures up to 500°F.

"Fat Content of Commonly Used Foods" is the title of a booklet released by the *Security-Connecticut Insurance Companies*. It is designed as "an aid in the reduction of dietary fat." In a nontechnical introduction, the booklet summarizes the opinions of recent medical researchers. The main section of the booklet is a six-page table giving figures for commonly used foods adapted from Bowes and Church for: total calories, protein calories, carbohydrate calories,

"By George! He must have been thinking about another cup of rich-tasting Continental Coffee!"

Everyone Enjoys

More Coffee Flavor

In every walk of life everyone enjoys rich, full-bodied, invigorating CONTINENTAL COFFEE. Superb blending of the world's choicest coffees and precise roasting with automatic controls assure unfailing uniformity. Write today for a FREE trial package.

Continental Coffee

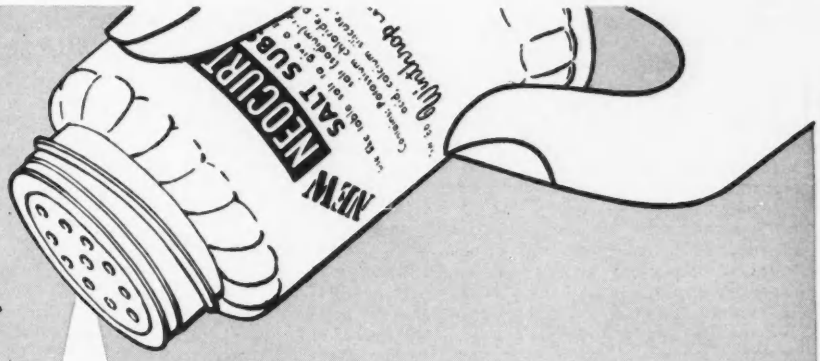
AMERICA'S LEADING COFFEE for Restaurants, Hotels and Institutions

CHICAGO • BROOKLYN • TOLEDO

In the Pacific Northwest it's

ROYAL CORONA COFFEE

Seattle, Washington



New

Neocurtasal

TASTES LIKE SALT

New Neocurtasal embodies the characteristic tang, grain and texture of regular table salt. Now whether food is seasoned by New Neocurtasal or salt — few patients detect the difference. Insipid dishes are rendered more palatable, tiresome diets less exacting.

When you must say "no salt," New Neocurtasal effectively cushions the blow. In selecting a most suitable replacement for salt, more and more physicians observe that New Neocurtasal assures close adherence to diet and the utmost in patient cooperation.

NEW **Neocurtasal**® — available in convenient 2 oz. shakers and 8 oz. bottles.

"An Excellent Salt Replacement"

Contains potassium chloride, potassium glutamate, glutamic acid, calcium silicate, potassium iodide (0.01%).

When Diuresis Is a "Must"—

SALYRGAN®-THEOPHYLLINE

Parenteral • Oral

Winthrop LABORATORIES • NEW YORK 18, N. Y.

Neocurtasal and Salyrgan (brand of mersalyl), trademarks reg. U. S. Pat. Off.

fat calories, and per cent of fat calories, as well as grams of fat. This table is followed by "tally" pages to record dietary intake for each meal for twenty days. The booklet is pocket or handbag size. Distribution will be through physicians.

Mealpack Corporation has designed a tray cart to carry twenty-eight trays in the popular 16½ by 22½-in. size, instead of the usual twenty. It requires no electric pre-warming. Elimination of pre-warming elements and internal wiring permit speedy, high-temperature "shower bath" washing inside and out. Space is provided for the following removable Mealpack accessories: two 7-qt. beverage dispensers for adding hot and cold beverages or broths; one 5-qt. food jar for protecting and serving bulk soups, bulk ice cream, or hot cooked breakfast cereals; and one 2-slice, pop-up-type electric toaster. The insulated cold compartment includes stainless steel pull-out shelves. Optionally these are interchangeable with Mealpack "Freezi-shelves" which, when charged in deep-freeze before insertion, provide refrigeration for butter, salads, ice cream, cold desserts, milk, fruits.

Koch Refrigerators, Inc., announces the new "M A" line of reach-in refrigerators, designed to permit convenient installation in back-bar and other limited access areas, with body depth of 26 in. instead of 34 in. and with 32 and 50 cu. ft. capacity. The interiors of stainless steel or porcelain are practically seamless and coved for easy cleaning. Flexibility of arrangement affords adjustable, removable, and interchangeable features. The refrigerators are manufactured in stainless steel, white porcelain, and four harmonizing porcelain decorator colors.

Gerber Baby Foods has introduced three varieties of "High Meat Dinners," beef with vegetables, chicken with vegetables, and veal with vegetables, in both strained and junior textures. Reflecting the recommendations of doctors for more meat and protein in baby diets, Gerber has added three times as much meat with selected vegetables and cereal to provide a variety of nutrients and agreeable flavor. The new product is rated excellent in vitamin A value and niacin. The foods are packed in 5-oz. containers.

Bottled in individual 2-oz. containers and dispensed from a decorative brass-finished serving tray designed by *Louis Milano Foods, Inc.,* called Serv-A-Rack, hospital patients may now be given a choice among six of Milano's salad dressings: 1890 French, Buccaneer, Bleu cheese, DeCisco garlic, Caesar, Italian, and Roquefort cheese. The Serv-A-Rack is compact, easy to carry, and tip-proof.

Dill Manufacturing Company has designed a line of stainless steel tongs for food handling and serving. Called Pomtongs, they are available individually or in sets, in 6-, 9-, and 12-in. lengths. They feature serrated gripping edges to hold food securely without tearing or puncturing and are made of stainless steel, which will not rust or corrode.

A new self-contained snack bar requiring only 10½ sq. ft. floor space is offered by *Roll-A-Grill Corporation of America.* A pre-mix dispenser of cold drinks (one loading of six cans of product and one cylinder of carbon dioxide) and a grill section that cooks 10 frankfurters at one time, or 200 per hour, are features of this unit. Grills are also available to cook 400 frankfurters per hour. All units are equipped with a hard maple cutting board and a refrigerated section constructed of heavy gauge galvanized steel.

Amcoin Corporation announces the introduction of a new electric three-piece battery, designed for quick delivery of large quantities of coffee. The battery features an all-glass interior, completely protected from metal, and automatic control of temperature. Two sizes are available: two 4-gal. side urns and one 15-gal. hot water boiler, or two 8-gal. side urns and one 20-gal. hot water boiler.

Universal Dishwashing Machinery Company has released a new single tank semi-automatic, door-type dishwashing machine. All interior parts, tracks, strainer pans, shelves, and wash-and-rinse assembly are easily removed by hand for cleaning. When the machine is equipped with electrically timed Wash and Rinse Control, a solenoid locks the lever so that the time cycle cannot be interrupted. The unit will handle 19¾ by 19¾-in. racks.

Harbinger of fall is the new autumnal menu folder of *Aatell & Jones, Inc.,* called the "Sylvan Retreat." The cover of the folder is a photograph of a small weathered cabin midst foliage of brilliant hue. Printed in four processed colors, this new menu folder is available only in a 8¾ by 11¼-in. size.

Reprints of the

Journal of The American Dietetic Association*

The following are a few selected reprints still available: See page 1103 for other reprints you may order.

Teaching

LEITCH, M. A.: Educational standards for student nurses in the dietary department. (April) 1956. $.10

DEPAUL, SR. ANNE: Diet therapy practice for the student nurse. (April) 1956. $.05

TEEL, K. B.: Teaching student nurses in Massachusetts. (April) 1956. $.10

A compilation of three articles (April) 1957. $.15

THIGPEN, L. W. AND MITCHELL, I. A.: Integrating nutrition into nursing education.

CAROLYN, SR. MARY: What courses should precede or parallel nutrition in the basic curriculum?

MIRIAM, SR. XAVIER: Simultaneous correlation of nutrition and diet therapy for student nurses.

Planning a Workshop on Teaching Nutrition in the Nursing Curriculum. Mimeographed. $.15

Infants and Children

BOSLEY, B.: A practical approach to nutrition education for children. (April) 1947. $.15

STUART, H. C. Children's nutritional needs during growth and development. (November) 1949. $.10

The Department of Pediatrics of the University of Chicago. Liberal infant feeding. (July) 1946. $.10

WALLACE, M. V.: Feeding the hospitalized child. (May) 1953. $1.0

Food Misinformation

A NEW booklet—*Food Facts Talk Back* $.50;
In lots of 5—2.25; In lots of 10—4.00; In lots of 50—17.50.
(A 32 page booklet of fallacies and correct statements presented in layman's language.)

BEEUWKES, A. M.: Characteristics of the self-styled scientist. (July) 1956. $.10

HUENEMANN, R. L.: Combating food misinformation and quackery. (July) 1956. $.10

OLSON, R. E.: Research, fads and practical dietetics. (August) 1955. $.15

Allergy

Allergy Recipes. $.50; In lots of 10—4.50; In lots of 50—20.00. New Revision.

* A new *Publications and Reprints List* is available on request from the Headquarters office, 620 North Michigan Avenue, Chicago 11, Illinois.